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ABSTRACT

Why Volunteer?
Evidence on the Role of Altruism, Reputation, and Incentives[*]

Volunteering plays a prominent role in the charitable provision of goods and services, yet we know relatively little about why people engage in such prosocial acts. The list of possible motivations is long, but recent research has focused on altruism, reputational concerns, and material incentives. We present an analysis of a unique data set that combines an experimental measure of altruism, surveyed measures of other factors including reputational concerns, and call records from volunteer firefighters that provide an objective measure of the hours volunteered. Controlling for a variety of other explanations, we find that altruism and reputational concerns are positively associated with the decision to volunteer. Moreover, by utilizing variation in the presence and level of small stipends paid to the firefighters, we find that the positive effect of monetary incentives declines with reputational concerns, supporting a prediction that extrinsic incentives can crowd out prosocial behavior.

JEL Classification: C93, D12, J22, D64, D82

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1   Introduction

In 2001 in the United States, an estimated 84 million people volunteered an average of 4 hours per week, yielding the annual equivalent of over 200 billion dollars of labor (Independent Sector, 2001). The prominent role of volunteering in the charitable provision of goods and services has helped to motivate a variety of theoretical models of prosocial behavior over the past twenty years. However, a lack of appropriate data has left economists with an incomplete understanding of why people supply labor seemingly for free.

To date, the empirical literatures on volunteering and altruism have relied mostly on a handful of survey-based data sets or on evidence from laboratory settings. Survey-based evidence suggests that wages and income are related to volunteer labor supply (Menchik and Weisbrod, 1987; Freeman, 1997), but Freeman (1997) finds that a far larger determinant than cost is simply being asked to volunteer and concludes that volunteer labor supply is determined more by tastes for prosocial activities than by income and costs. In addition, government spending appears to at least partially crowd out volunteering, suggesting that volunteers care both about the level of provision of their product as well as about the act of giving itself (Menchik and Weisbrod, 1987; Brown and Lankford, 1992; Duncan, 1999; Ziemek, 2006). Laboratory experiments designed to measure altruism have told us that people behave in a manner consistent with a mixture of "pure" and "warm-glow" altruism, but it is unclear to what extent either drives the decision to volunteer outside of the lab (Andreoni, 1993; Andreoni and Miller, 1993; Forsythe et al., 1994; Hoffman et al., 1994; Palfrey and Prisbrey, 1997; Goeree et al., 2002; Andreoni and Miller, 2002).

In this paper we add to our understanding of the motivations of volunteers with a unique data set that combines experimental and survey data for both non-volunteer community members and volunteer firefighters with an objective

measure of the firefighters' provision of volunteer labor via department records. Our data provide both the usual demographic controls as well as measures of various taste-related factors that may influence the decision to volunteer. Moreover, they allow us to avoid many possible pitfalls of using survey or lab-based data alone. Along with problems associated with the hypothetical nature of some survey questions or the measurement error likely to occur when people are asked to recall their level of volunteerism, self reports may be especially susceptible to what Carpenter (2002) terms *idealized persona bias* in which a respondent projects the person that he would like to be. We therefore use an experimental measure of altruism via the dictator game in which there are real material costs associated with revealing prosocial preferences. In addition, rather than relying on self-reports of volunteer labor supply, we utilize call records from fire departments that record which members "turned out" for calls over the course of a calendar year.

We find that altruism is a key motivator in choosing to join the volunteer fire service, which supports the external validity of our version of the dictator game in predicting real-life behavior. However, conditional on selection, altruism plays a role in training hours but not in call response, suggesting that the visibility of the action may be important. In contrast to the results for altruism, reputational concerns, as proxied by having a vanity license plate, are associated both with the decision to volunteer as well as with the visible activity of call response. Moreover, we find that paying small stipends to the volunteers increases turnout for some but that the effect is dampened for those who have greater reputational concerns. These results confirm recent theoretical predictions that providing extrinsic motivations to volunteers can have unintended negative effects (Bénabou and Tirole, 2006).

We proceed with an overview of theories of prosocial behavior such as volunteering and with a model that incorporates altruism, reputational concerns,

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and material rewards into the decision to volunteer. Section 3 then provides a description of the data. In Sections 4 and 5 we examine selection into the fire service and the call turn out of volunteer firefighters. We offer concluding remarks in Section 6.

2   A model of "turning out"

Papers in the public finance and labor literatures have traditionally treated prosocial behavior such as volunteering as generating some combination of a public good, consumption good, or investment good (e.g., Menchik and Weisbrod, 1987; Brown and Lankford, 1992; Duncan, 1999). Others have focused more on the role of "pure" and "warm-glow" altruism in motivating volunteers (e.g., Becker, 1974; Andreoni, 1989, 1990, 2006; Bénabou and Tirole, 2006). The differences in terminology– which serve to emphasize the nature of the activity versus the nature of the volunteer– mask what are essentially similar approaches. Whether volunteering is thought of as a public good or as the product of pure altruism, the individual cares only that some level of the good is provided and not who is responsible for the provision; hence, government spending on the public good will "crowd out" private donations of time or money. If volunteering is instead a consumption good or the product of "impure" or "warm-glow" altruism, (Andreoni, 1990) the act of giving itself generates utility for the volunteer, and government provision will not compete to the same extent with private provision. A third possibility is that there are other extrinsic motivations for volunteering beyond utility gained from the public good created or by the act of giving. One example is investment models in which volunteering is a means of obtaining human capital that will yield returns in the labor market (Menchik and Weisbrod, 1987; Ziemek, 2006).

Like Ariely et al. (2007) we borrow from the model of prosocial behavior de-

veloped by Bénabou and Tirole (2006) (BT), which emphasizes the relationship between (pure or impure) altruism, extrinsic motivations, and reputation. Our model is slightly simpler in that we focus attention on one's interest in maintaining a reputation for prosociality and ignore any other reputational concerns. While simpler, our version is still sufficient to motivate the issues on which we collect data.

Agents in the model are motivated by three factors: altruistic preferences, extrinsic monetary incentives, and reputational concerns. Agents with altruistic preferences for the social good place a value, v_a on prosocial activities, a, like joining the local fire department or "turning out" for individual calls. Agents may receive monetary compensation, y, for their prosocial acts (e.g., some firefighters receive modest hourly wages for their efforts) which they value at $v_y y$. Lastly, some agents care about their reputations in the community according to $R(a, y)$. Combining these three sources of motivation with the cost of engaging in prosocial acts, $C(a)$, we have:

$$U(a) = (v_a + v_y y)a + R(a, y) - C(a). \qquad (1)$$

The first and last terms in (1) are straightforward especially because we set $C(a) = \frac{ka^2}{2}$; however, the image concerns require further elucidation. We assume that an agent's preference type, (v_a, v_y), is determined by an independent draw from a bivariate normal distribution and define one's reputation concern as follows:

$$R(a, y) = xI_\Upsilon(z)E(v_a|a, y) \qquad (2)$$

where x determines the extent to which an altruistic act will be visible and $I_\Upsilon : z \to \{0, 1\}$ is an indicator function publicly identifying those agents who are motivated by reputation, $E(v_a|a, y)$, or the beliefs of others about the agent's

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value on prosocial activities. In other words, agents with image concerns comprise a subset Υ of the population.

Substituting (2) and $\frac{ka^2}{2}$ into (1) and differentiating yields the first order conditions for the optimal level of prosocial behavior which depend on whether or not image concerns matter.

$$ak = \begin{cases} v_a + v_y y & \text{if } z \notin \Upsilon \\ v_a + v_y y + x \frac{\partial E(v_a | a, y)}{\partial a} & \text{if } z \in \Upsilon \end{cases} \tag{3}$$

For those unconcerned with reputation the optimal level of prosociality is easy to determine: $a^* = (v_a + v_y y)/k$.

Solving the first order condition for those agents valuing reputation is harder than it first appears because it is not simply a matter of evaluating the expectation, $E(v_a | a, y)$, and substituting in its derivative. At the heart of the model is a signal extraction problem in which on-lookers need to evaluate the altruistic intentions of the agent (v_a) using the entire decision problem. In other words on-lookers need to anticipate how agents will respond to incentives when they evaluate their actions.

To see the subtle nature of the problem, we (following BT) exploit the fact that an agent's choice of a reveals a clue about his intentions. The clue, from (3), is that $v_a + v_y y$ is equal to $ak - x \frac{\partial E(v_a | a, y)}{\partial a}$ at the optimum. This means that although one can not determine v_a directly from one's choice of a, one can make inferences about v_a based on $v_a + v_y y$ because v_a and v_y are jointly distributed and y is exogenously determined.

Valuation types are distributed $N \left(\begin{array}{c} \bar{v}_a \\ \bar{v}_y \end{array}, \begin{bmatrix} \sigma_a^2 & \sigma_{ay} \\ \sigma_{ay} & \sigma_y^2 \end{bmatrix} \right)$ which means that after considerable calculation[1], one can derive

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[1]Following from the fact that if $(x_1, x_2) \sim N \left(\begin{array}{c} \mu_1 \\ \mu_2 \end{array}, \begin{bmatrix} \sigma_1^2 & \sigma_{12} \\ \sigma_{12} & \sigma_2^2 \end{bmatrix} \right)$ then $(x_1 | x_2) \sim N \left(\mu_1 + \frac{\sigma_{12}}{\sigma_2^2}(x_2 - \mu_2), \ (1 - \varrho^2)\sigma_1^2 \right)$ where ϱ is the correlation coefficient, $\frac{\sigma_{12}}{\sigma_1 \sigma_2}$.

$$E(v_a|a,y) = E(v_a|v_a + v_yy) = \bar{v}_a + \frac{\sigma_{v_a,\ v_a+v_yy}}{\sigma^2_{v_a+v_yy}}(v_a + v_yy - \bar{v}_a - \bar{v}_yy)$$

and after substituting from the first order condition (3) we get

$$E(v_a|a,y) = \bar{v}_a + \frac{\sigma_{v_a,\ v_a+v_yy}}{\sigma^2_{v_a+v_yy}}(ak - x\frac{\partial E(v_a|a,y)}{\partial a} - \bar{v}_a - \bar{v}_yy). \qquad (4)$$

Now notice that if we take the derivative of (4) with respect to a we get

$$\frac{\partial E(v_a|a,y)}{\partial a} = \rho k - \rho x \frac{\partial^2 E(v_a|a,y)}{\partial a^2}. \qquad (5)$$

where $\rho = \frac{\sigma_{v_a,\ v_a+v_yy}}{\sigma^2_{v_a+v_yy}}$. With some rearranging, (5) takes the form of a linear differential equation that has the general solution

$$\frac{\partial E(v_a|a,y)}{\partial a} = \rho k + \xi e^{\frac{-a}{\rho x}}$$

in which ξ is a constant of integration. Lastly, as in BT, because the agent's objective function is well behaved only if $\xi = 0$, an interior solution occurs where $\frac{\partial E(v_a|a,y)}{\partial a} = \rho k$ and the first order condition for agents with image concerns becomes

$$ak = v_a + v_yy + x\rho k.$$

The last thing to do is to evaluate ρ and substitute. This results in the following prediction about the extent to which agents will engage in prosocial behavior.

Proposition 1 *There is a unique reputational equilibrium in which prosocial acts depend on one's type, the material incentive and whether or not one is concerned with reputation. Those not concerned with reputation contribute at the level $a^* = \frac{(v_a+v_yy)}{k}$ and those with image concerns contribute $a^* = \frac{(v_a+v_yy)}{k} + x\frac{\sigma^2_a + y\sigma_{ay}}{\sigma^2_a + 2y\sigma_{ay} + y^2\sigma^2_y}$.*

Regardless of one's concern for reputation, altruistic preferences, v_a, increase one's supply of prosocial behavior; however, the net effect of the material incentive y is only unambiguous for those agents who do not worry about their reputations. Using Proposition 1 we can generate three comparative static predictions which will form the basis of our empirical examination of the behavior of volunteer firefighters.

Corollary 2 *Agents with higher altruistic valuations supply more prosocial behavior.*

Corollary 3 *Agents who do not care about reputation supply more prosocial behavior when the material incentive increases.*

Corollary 4 *For agents who care about reputation and $\sigma_{ay} = 0$, an increase in material incentives crowds out prosocial behavior to some extent.*

Clearly, the derivative $\partial a^*/\partial v_a$ is positive indicating that we should expect an unequivocal relationship between one's altruistic preference and volunteer behavior. Likewise, for those people who do not worry about their image, the effect of an increase in the material incentive, $\partial a^*/\partial y|_{z \notin \Upsilon}$, should also be positive. However, once one's image enters into the calculations, the effect of material incentives becomes less clear except for the fact that if prosocial acts are not publicly visible (i.e., $x = 0$) then even people with reputation concerns act as if they don't care. In addition, if we are willing to consider the BT baseline case of $\sigma_{ay} = 0$, then the derivative of interest, $\partial a^*/\partial y|_{z \in \Upsilon}$, indicates at least partial crowding out because the derivative of the reputational part of a^* is negative. What is unknown is whether the negative effect of material incentives on one's image is sufficient to counterbalance the draw of higher compensation. In the case of our volunteer firefighters, we will see that the two effects are of roughly equal magnitude so that the net effect of material incentives is zero for volunteers with reputational concerns.

3　An overview of the data

Vermont is comprised mostly of rural areas that rely almost exclusively on volunteer fire firefighters to respond to emergencies such as hazardous material spills, vehicle accidents, carbon monoxide alarms, and, of course, fires. Of the 237 fire departments in the state, only 10 are made of up of full-time paid professional firefighters while the remainder rely on volunteers.

In February of 2006 we sent an initial survey to fire chiefs in the state that requested information on the number of firefighters at their department, any compensation paid, annual calls, and training requirements. One hundred twenty nine surveys were returned, yielding a response rate of 55 percent. Based on these surveys, the time commitment for volunteer firefighters is substantial. Half of departments require that volunteers complete "Firefighter I" training, which requires 144 hours of class time over seven months, before being admitted as a full member. Firefighters who drive department vehicles or seek additional certification in fire fighting, tactical rescue, and other areas of expertise are required to complete additional training. All departments that we contacted also have training sessions that are usually held once a month. In addition to time spent training, volunteer firefighters in the state of Vermont are provided pagers that issue a company-specific tone in the event of a call followed by radio information from the dispatcher. Ideally, firefighters are expected to respond to a tone if they are nearby and able, but in practice there is little oversight and each firefighter decides on a call-by-call basis whether to respond. The number of calls varies by department; the median number of calls in 2005 for our sample was 79, or roughly a call every four and a half days.

In the summer of 2006 we conducted an experiment and a survey of 205 Vermont volunteer firefighters from 39 departments by both visiting individual stations and by attending the state firefighter convention or "muster." The

chiefs of six departments provided "call records" for 2005 with the date, time, and nature of each call as well with information on which of the firefighters responded. We then visited these departments during their monthly meetings and passed out fifteen-page experiment/survey booklets for the firefighters to complete, which yielded 143 firefighter observations. We also set up a booth at the annual state muster and passed out our materials, yielding another 62 observations, although these cannot be paired with call records from any department.

So that we could study selection into the fire service, we also conducted our protocol with non-firefighter Vermonters. We purchased a sample of 2000 addresses in the state that were drawn randomly on all criteria save gender. Because firefighters are predominantly male, we chose to oversample males in the community survey. Community members were sent letters with a brief explanation of the protocol accompanied by a booklet. In order to increase response rates, we also gave them the option of responding online.[2] Four hundred thirteen community members responded to the full survey. Twelve of these community members happened to be current volunteer firefighters and were added to the sample of firefighters.[3] Of the remaining 401 community members, 212 engaged in some other form of volunteer activity and were removed from this analysis. One hundred eighty nine community members reported no volunteer activity and form the "control" group to which we compare firefighters.

Motivations for Volunteering

We gathered data on six behavioral motives for volunteering for the fire service. In addition to the two motives that the model focuses on (altruism

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[2]Ninety percent of community members responded to the paper version of the protocol.
[3]For the twelve firefighters who completed the community surveys, we are missing information on the firefighter-specific questions that were not included that version of the survey. In our analysis, these twelve firefighters are included the probit models of selection into firefighting. However, they are not included in the models of volunteer hours or call response.

and reputation), we asked survey questions about career concerns, using the fire service to make or be with friends (or being an extrovert in general), one's attitude towards risk, and volunteering to comply with religious beliefs. The details are as follows and the appendix reproduces the protocol for the behavioral measures that we gathered.[4]

To measure altruism we designed a field experiment based on the original dictator game (Forsythe et al., 1994) and a version in which a context similar to the decision to volunteer was emphasized (Eckel and Grossman, 1996). In our version of the game participants were first asked to pick among thirteen charities or write in a charity of their choice. We allowed our participants this latitude to increase the chances that they felt altruistically towards the potential recipient.[5] They were then asked to decide how much of a $100 endowment to transfer to their chosen charity. Given the large expected sample size, each participant was told that we would randomly implement 10% of the allocation decisions after they were all collected.

After the collection phase was finished we wrote checks to the charities for the total amounts donated and, to preserve the anonymity of their responses, we sent unnamed VISA gift cards for the residual shares of the $100 to the chosen decision-makers. Obviously, we could not run the experiment double blind because we needed to send the chosen decision-makers the money that they decided to keep and we needed match the experiment and survey data to the call records for the firefighters. That said, we tried to make the decision as anonymous as possible. In addition to the unnamed gift cards, participants were always referred to by an anonymous alphanumeric code, they were explicitly told

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[4]For the sake of length, we only highlight the design of our experiment and survey. The protocol is discussed at length in Carpenter et al. (2007) which focuses on the difference between our community sample and a sample of students. In addition, a copy of the firefighter survey booklet is available on both authors' web pages or by request.

[5]In the standard dictator experiment one has no choice over the recipient which means that the experimenter can not distinguish between a lack of concern for the imposed recipient or a general lack of altruism.

not to write their names anywhere on the booklets and, during the firehouse visits, participants returned their completed booklets in a covered box near the back of the room away from the experimenters.

We decided that an indirect and less obvious approach towards measuring one's concern for reputation was best. Instead of asking directly whether participants valued their reputation in the community, we asked a question designed to determine whether they chose to display something that would affect one's reputation or draw attention to one's self. When people in the state of Vermont register their automobiles they are randomly issued a license plate but can chose to pay more to receive a "vanity plate." Vanity plates consist of special lettering or of the addition of a special placard to the plate. Examples of possible placards include endangered animals on the "Conservation" plate, children's drawings on the "Building Bright Futures" plate, the purple heart medallion issued to wounded soldiers or the international symbol of the Freemasons. We asked whether our participants purchased such a vanity plate for their vehicles. There are a variety of placards available to all Vermonters and we intend ownership of a vanity plate to be a proxy for reputational concern for both community members and firefighters. However, most firefighters select the placard shown in Figure 1. Displaying the maltese cross on one's vehicle broadcasts to everyone that the driver is a person that volunteers a lot of time to the community. It is also important to note that the placard in Figure 1 does not help volunteers respond to tones quickly because most volunteer firefighters purchase warning lights and sirens for their personal vehicles for this purpose. In other words, there are ways to be modest about one's involvement (e.g., by installing dashboard-mounted rather than roof-mounted flashing red lights on a personal vehicle) but spending more on the plate in Figure 1 is not one of them.

We also considered other, un-modeled, reasons why people might volunteer for the fire service. It might be the case, for example, that people think that

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volunteering will enhance their performance on the job or help them get a job (Clary and Snyder, 1999). To asses this motive we asked about the degree to which respondents agreed with three statements about the career impacts of volunteering. People might also volunteer because they are extroverts and the fire service allows them a new opportunity to interact with other people. In addition to two direct questions about making friends or having friends already in the fire department, we asked participants to respond to five extroversion statements borrowed from the NEO personality inventory (Costa and McCrae, 1992). Interior fire fighting is not the only risky endeavor facing volunteers; simpler tasks like ventilating a roof can become dangerous when certain circumstances are accounted for (e.g., height, pitch, roofing material, weather). It might, therefore, be reasonable to believe that risk seekers are more likely to join. We included six statements from the Weber et al. (2002) risk assessment scale to assess each individual's willingness to engage in behaviors that were risky to one's health (e.g., bungee jumping). The last factor that we though might motivate a person to volunteer for the fire service is his commitment to religion. Because many religions preach service to one's community, we asked participants to rate how religious they were and we asked them how often they attended religious services.

In addition to the behavioral measures that we focus on, we collected an extensive set of demographics and two factors that we either thought would be particularly important in this situation or have been discussed before. Many fire departments in Vermont are associated with long family traditions and many people join because of family connections. Because of this we gathered information on the number of family members one has in service ($family\ ff$). Freeman (1997) found that one of the biggest indictors of whether or not one volunteers is whether the person had been explicitly asked to serve. We asked a similar question (*invited*).

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Table 1 provides a description of the variables used in the analysis as well as their means for volunteer firefighters and non-volunteer community members. For inventories in which participants responded to a number of statements (career concerns, extroversion, attitudes towards risk), we summarize their motives via factor analysis. Looking at differences in means, we see that, relative to non-volunteer community members, volunteer firefighters score higher on all behavioral measures that we expect to contribute to a proclivity for prosocial behaviors. Firefighters allocate more to charity in the dictator game, are more likely to have a vanity plate, and score higher on inventories of career concerns in volunteering, social concerns in volunteering, extroversion, and risk. Firefighters are also more likely to be religious, to have family members who are firefighters, and to have been invited to join the department.

Figure 2 presents a histogram of charitable allocations in the dictator game for volunteer firefighters, volunteer community members, and non-volunteer community members. While we limit later analysis to a comparison of firefighters and non-volunteer community members, it is interesting to note that both volunteer firefighters and volunteer community members have similar outcomes in the dictator game that suggest that volunteering is positively associated with this measure of altruism. Fifty seven percent of firefighters and 51 percent of volunteering community members gave all $100 to charity while only 41 percent of non-volunteers did so.[6] Non-volunteers are more likely to have kept over half of the money.

4   Estimates of volunteering

Table 2 presents the results of a probit analysis of selection into volunteer firefighting. The dependent variable indicates whether a respondent belongs to

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[6]We use the amount allocated to charity as our measure of altruism. If we instead include an indicator for the respondent giving all of the money to charity, the results in the next two sections are similar.

our sample of volunteer firefighters or non-volunteer community members. We progressively increase the number of controls until Model 3, which includes measures of various motivations for volunteering (altruism, reputational concerns, career concerns, social concerns and extroversion, risk attitudes, religiosity, and an indicator for being invited) as well as demographic controls for age, gender, marital status, children, educational attainment, student status, employment status, income, wages, Vermont nativity, charitable donations, and distance from residence and workplace to the local fire department.

Altruism, as measured by the respondent's allocation to charity in the dictator game, is potentially endogenous to this model; altruism may motivate volunteers, but volunteering may also positively or negatively influence altruism. To identify altruism, we use a plausibly exogenous variable from the respondent's background that may have influenced his level of altruism prior to his decision to volunteer but that we do not expect to directly influence the current decision. We asked each respondent how much he or she thought his or her mom would have allocated in the dictator experiment (*mother allocation*) with the intention of measuring a variable that would have determined altruism via some combination of "nature" and "nurture." However, it is possible that respondent would tend to simply attribute their decision in the experiment to any other participant, yielding what psychologists would term a form of projection bias. To control for this possibility, we also asked what the respondent thought a random participant would donate (*random participant allocation*).

We carried out a range of diagnostic tests to assess the validity of these instruments. Looking at an (unreported) first stage regression of the dictator-game allocation on *mother allocation* and *random participant allocation* as well as the remaining exogenous variables from Model 3, we see that our two instruments are highly significant both individually and jointly (p-values for all tests <0.001). As expected, respondents who report that their mothers would

give more are predicted to give more themselves, even controlling for the possibility of projecting one's level of altruism onto others. We also performed a Sargan test of overidentification and fail to reject the null hypothesis that the instruments are uncorrelated with the error term in the selection equation. This again supports the validity of the instruments. Finally, we conducted a Hausman test comparing the coefficients from an IV model from those in an uninstrumented probit model. In this case the rank of the differenced variance matrix did not equal the number of coefficients being tested and we were unable to rely on the Hausman test statistic. However, a Hausman test for Model 1 indicates that the two models are statistically significantly different. Moreover, although we cannot assess statistical significance of the difference between the overall models, the point estimates of the coefficient on *altruism* are more than twice as large when instrumented in Models 2 and 3 and the difference is significant in the former. Taken as a whole, the results suggest that it may be necessary to endogenize altruism and we believe that we have appropriate instruments for doing so.

Turning to the results in Table 2, we see that altruism does have a significant positive effect on selecting into firefighting. An approximate one standard deviation increase in allocate ($30) is associated with a 13 percentage point increase in the probability of becoming a volunteer firefighter. The results confirm that altruism, as measured by the dictator game experiment, is positively associated with the real-life prosocial behavior of volunteer firefighting.

Respondents with vanity plates, our proxy measure of reputational concern, are 22 percentage points more likely to be a firefighter. However, like altruism, vanity plate may be endogenous. It is not clear to what extent people who value being seen select into firefighting and to what extent firefighters become concerned with image after they volunteer. While we can only report the positive correlation here, the distinction becomes less important in discussing later

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results on the interaction between reputation and extrinsic motivations.

Examining the remaining incentives for volunteering, we find that a one unit increase on the 1–5 Likkert scale question "Volunteering is a good way to make friends" is associated with a 24 percentage point increase in the probability of volunteering. The point estimates confirm that extroversion, risk-seeking behavior, and religion are all positively correlated with becoming a firefighter, but the estimates are not significant. Having family members who are firefighters also has a strong positive effect, as does being invited to join the department.

5 Estimates of turnout

The data include both a subjective and objective measure of the level of participation in the volunteer fire service conditional on selection into it. First, we asked firefighters to estimate their average monthly hours spent on training and call response. Second, for firefighters from six participating departments we obtained call records for 2005 that listed details of each call and which firefighters responded.

Table 3 reports the results of separate log-hours regressions of firefighter-estimated training and call hours.[7] Interestingly, (instrumented) altruism appears to be positively associated with training hours but not with call hours while reputation is positively associated with call hours but not with training. Responding to calls (in uniform on a large red truck with blaring sirens) is presumably far more visible than training (which usually takes place inside the station or in the station parking lots). The results suggest that altruism plays a larger role in the less-visible venue while reputation plays a larger role in the more-visible one. However, overall our models had little explanatory power and

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[7]These models are of volunteer hours supplied conditional on selecting into volunteering. $famff$ and *invited* were considered as possible instruments for a Heckman two-stage estimator of hours supplied. Results of the two-stage estimations are similar to those presented here. However, given the strong role that our instrument candidates play in call response in later models, we doubt their validity here.

most coefficients were insignificant. This may be the result of errors in self-reported participation or may reflect a lack of variation in hours.[8] The results in Table 3 are for a pared-down model that, like Model 2 in the preceding table, does not include demographic controls. The trade-off between altruism and reputation between the more and less-visible activities is present and of a similar magnitude in all specifications, but is not always statistically significant.

To our knowledge, previous studies of volunteerism all have relied on self-reported behavior. However, given that these reports may be unreliable, we turn to a more objective measure based on call records from six fire departments. We are able to match 120 firefighters from our survey to these call records. The data form an unbalanced panel in which each observation records a firefighter and a call.[9] Tables 4 and 5 report the results of several specifications of a random effects call response model. The effect of *altruism* is quite small and insignificant across models and, not surprisingly, tests of instrumental variable models suggest that we no longer need to instrument for it. We also choose to use a linear probability model rather than a random effects probit model both to avoid potential instability in the use of quadrature and to avoid difficulty in interpreting and calculating standard errors for interaction terms (Ai and Norton, 2003). Fewer than 3 percent of predictions fall outside of the $[0, 1]$ range and standard errors are corrected for heteroskedasticity induced by the linear model. Moreover, the marginal effects presented in Tables 4 and 5 are quite robust to model specification; we get similar estimates using random effects probits and instrumented probits as we do with the random effects linear probability model that we present.

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[8]The 25th and 75th percentiles of usual monthly training hours were 4 and 11 hours. The 25th and 75th percentiles of usual monthly call hours were 8 and 25 hours.

[9]Stations with more calls are over-represented in this panel. Controls are included for station-specific effects as well as for call volume and spacing. A separate balanced sample was also created by randomly selecting calls for each firefighter so that the number across firefighters is the same. Results using the balanced sample are not substantially different than those presented here.

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Table 4 presents three models of call response. In Model 1 we control only for characteristics of the call, call history, and department fixed effects. We find that firefighters are less likely to respond to calls during typical work hours or in the middle of the night. Call response is decreasing in the number of calls in the past week, suggesting the presence of call fatigue. And, as any volunteer firefighter could tell us, turnout is higher for calls for any sort of fire as opposed to vehicle accidents, alarms, etc. In Model 2 we add measures of different explanations for prosocial behavior and in Model 3 we add demographic controls as well. Altruism as measured by the dictator game allocation positively influences selection into the fire service, but does not have a significant effect on call response conditional on selection. Reputation, however, continues to be positively correlated with prosocial behavior; firefighters with a vanity plate are 16 percentage points more likely to respond to a call than those without. Endogeneity, however, is still a concern; it may be the case that firefighters who are more involved in their stations are more likely to purchase a vanity plate that displays their status. Career is also positively associated with call response. Interestingly, religion, which was positively correlated with selection into volunteer firefighting, is negatively associated with participation conditional on selection. Individuals who are identified as religious are 14.4 percentage points less likely to respond to a call.

While we are concerned that the direct effect of reputation may be endogenous, this does not preclude exploring how reputation interacts with extrinsic motivations, a key point of interest in the recent literature and our theoretical model. There is substantial variation across volunteer fire departments in Vermont in the presence and level of small stipends paid to firefighters. Many departments offer no recompense for the firefighters' time. However, others have a small pot of money that is divided annually among the firefighters. Others pay an hourly stipend for time spent on calls. These payments are unlikely

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to exceed the direct costs of participation in volunteer departments. Seventy percent of departments in our initial survey offer no compensation and, among those with an hourly wage for calls, the mean is 8.34, far below the mean salaries of firefighters who are often leaving work to respond to calls. Moreover, training time is not compensated by any departments and firefighters are responsible for purchasing the lights and sirens for their personal vehicles, which cost several hundred dollars.

In Table 5 we introduce both a dummy variable indicating that the department pays an hourly stipend and a variable measuring the amount of any stipend. Because the presence and level of stipends are colinear with the six departments represented in the sample, we remove the department indicators and replace them with a measure of annual call volume, which is likely an important determinant of call response that was controlled for previously with the station indicators.

While it is still likely that omitted characteristics of the station and community are correlated with *stipend*, we are more interested in the interaction between payments and reputational concerns as proxied by having a vanity plate. These interaction terms in Models 5 and 6 are considerably less likely to be correlated with the error term given that we have controlled for the direct effects of the interacted terms. In the first specification, we find that the reputational concerns and the presence of a stipend are both positively associated with turning out to a fire call. Firefighters with a vanity plate are 33.1 percentage points more likely to respond to a call. Firefighters who are paid an hourly stipend are 3.0 percentage points more likely to respond than firefighters who are not paid a stipend. But the positive effect of a stipend is canceled for firefighters who have vanity plates; the effect of a stipend for those with reputational concerns is effectively zero. Looking at the second model, in which the level rather than presence of a stipend is used, we see essentially the same result.

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For a $1 increase in the level of the stipend, firefighters who do not have vanity plates are 21.7 percentage points more likely to turn out to a call. However, the marginal effect of a stipend for firefighters who have vanity plates is not significantly different from zero. The negative coefficients on the interactions terms indicate that the positive direct effect of small extrinsic incentives is crowded out by reputational concerns for some firefighters, as predicted by the model.

6   Conclusion

We have introduced unique data on volunteer firefighters and non-volunteer community members that combine survey measures of demographic and behavioral attributes with a measure of altruism generated by the dictator game. The data also include an objective measure of volunteer labor supply for the firefighters via departmental call records. Using these data, we are able to test the predictions of a model in which prosocial behavior is determined by a combination of altruism, reputational concerns, and extrinsic motivations.

We find that altruism as measured by the dictator game plays a key role in the real-life decision to volunteer, and that it also is positively correlated with firefighter training hours. However, altruism does not appear to influence a firefighter's decision to respond to a call, suggesting that altruism is not an important motivator in the level of provision of the more visible of the two firefighting activities. Reputational concerns as proxied by having a vanity license plate, on the other hand, are positively associated both with the decision to volunteer and with call responses. We also find that social and career concerns positively influence volunteerism, while religion has a positive impact on the decision to volunteer, but is negatively associated with call response conditional on having volunteered.

Recent research has focused on the potential impacts of offering extrinsic

incentives for prosocial behavior. We are able to offer empirical evidence on this by taking advantage of variation in the presence and level of small stipends paid to volunteer firefighters in Vermont. We find that offering such extrinsic incentives to volunteers has the direct effect of increasing call response. However, this effect is negated for volunteers with reputational concerns; offering extrinsic incentives to this group has zero net effect on their volunteer labor supply. This result suggests that policy makers and volunteer organizations wishing to influence prosocial behaviors should account for the complex interplay of extrinsic incentives and reputation. Volunteers may value monetary rewards, but such rewards can also have the indirect and presumably unanticipated effect of discouraging prosocial behavior among those who care about being perceived as altruistic.

A   Appendix:
Protocols for the behavioral variables

Altruism as measured by Dictator Game

Splitting $100

We begin the survey with a three-part decision-making task that involves real money. In this task you will allocate $100 between yourself and a charity of your choice. You will simply decide how much of the $100 you want us to send directly to you and how much you want us to send to the charity. The funds for this part of the survey have been provided by the National Science Foundation. We expect that 500 people will respond to this survey. When we have collected 500 responses we will randomly pick 50 people and implement their decisions. This means that you have a 1 in 10 chance of having your choice implemented. In other words, for 1 in 10 people we will send you and/or the charity that you select actual money. Therefore, you should consider your choices carefully.

The first thing that you will do is choose a charity. Then you will choose how to allocate $100 between yourself and the charity that you picked. If you are one of the 50 chosen participants, your choice will be implemented and you and/or your charity of choice will receive the amounts of money that you have selected.

Part A:

Please choose the charity that you want to receive your donation.Pick one of the following charities or write in a charity at the bottom:

- o   American Red Cross
- o   United Way
- o   Vermont Public Radio
- o   Amnesty International

o   American Cancer Society

o   Doctors without Borders

o   United Service Organizations (USO)

o   UNICEF

o   Vermont Land Trust

o   Humane Society of the United States

o   Habitat for Humanity

o   The Nature Conservancy

o   American Diabetes Association

o   Other: _____

Part B:

Choose the amount of money that you want us to allocate to the charity of your choice. The remaining money will be sent in the form of an anonymous VISA gift card directly to you.

Allocate ____ of the $100 to my charity of choice and send the rest to me.

Career Questions

For each of the following statements, please indicate how strongly you agree using the scale provided below.

1:Strongly Disagree 2:Diagree 3:Neither 4:Agree 5:Strongly Agree

In general, it looks good to have volunteering on your resume.

Volunteering can help me to develop skills that will benefit me in my chosen profession.

Volunteering can help me make contacts that are important to me professionally.

Extroversion Questions

On the following pages there are phrases describing people's behaviors. Please use the rating scale below to indicate how accurately each statement describes you. Describe yourself as you generally are now, not as you wish to be in the future.

1:Very Inaccurate 2:Inaccurate 3:Neither 4:Accurate 5:Very Accurate

Feel Comfortable around people.

Make friends easily.

Am skilled in handling social situations.

Don't like to draw attention to myself.

Talk to a lot of different people at parties.

Risk Questions

For each of the following statements, please indicate your likelihood of engaging in each activity or behavior using the scale provided below.

1:Very Unlikely 2:Unlikely 3:Neither 4:Likely 5:Very Likely

Going down a ski run that is beyond your ability or closed.

Going whitewater rafting during rapid water flows in the spring.

Not wearing a seat belt when a passenger in the front seat.

Periodically engaging in a dangerous sport (e.g., mountain climbing or sky diving).

Trying out bungee jumping at least once.

Piloting your own small plane, if you could.

Religion Questions

Please rate your religious outlook.

     o   Religious

     o   Somewhat religious

     o   Not very religious

     o   Not religious

     o   Don't know

How often do you attend organized religious services?

     o   Never

     o   Rarely

     o   Occasionally

     o   Regularly

     o   Very often

A complete version of the survey booklet is available at both authors' websites.

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Figure 1: **Sample vanity plate**

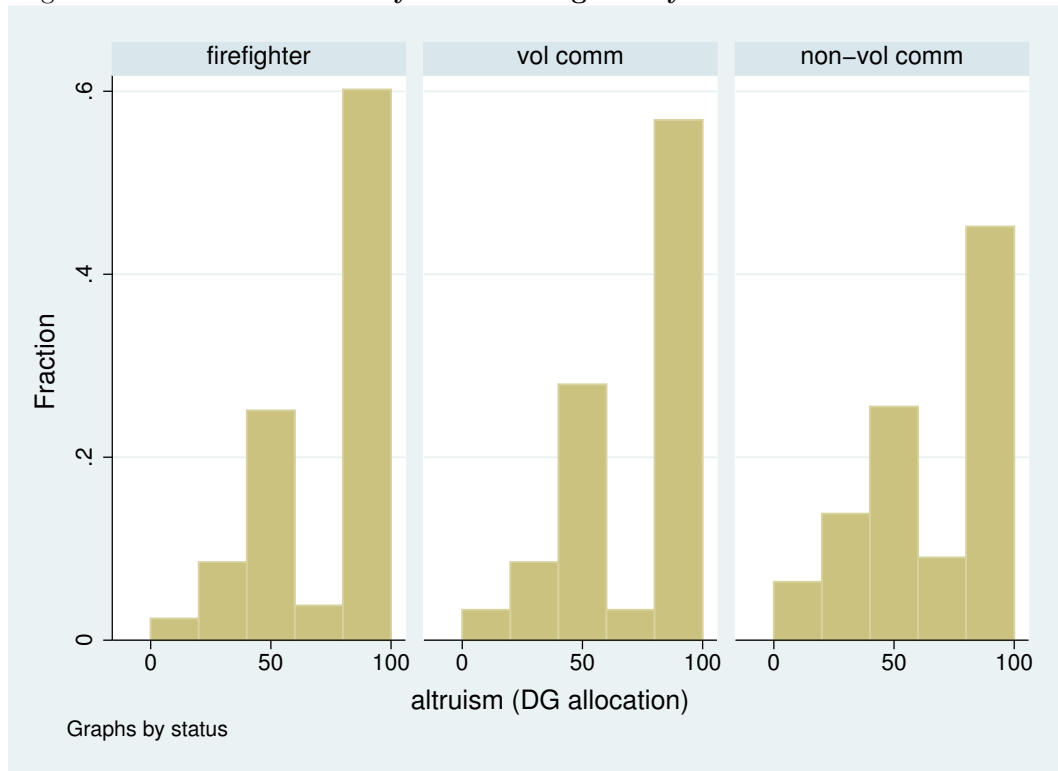Figure 2: **Allocation to charity in dictator game by volunteer status**

Graphs by status

Table 1: **Variable descriptions and means**

variable	description	volunteer firefighters	community members
Behavioral factors			
altruism	allocation to charity in dictator game ($0-$100)	77.35	67.92
reputation	I(non-standard ("vanity") license plate)	0.23	0.11
career	factor score for 3 questions about volunteering and career concerns	0.26	-0.23
friends1	volunteering is a good way to make friends (scale 1-5)	4.60	4.10
friends2	I(friends on fire department prior to joining)	0.75	0.47
extroversion	factor score for 5 extroversion questions	0.18	-0.21
risk	factor score for 6 risk questions	0.32	-0.14
religious	I(attends religious services and/or rates religious outlook as at least somewhat religious)	0.66	0.52
family ff	I(have family member who is a firefighter)	0.59	0.24
invited	I(have been invited to join local fire department)	0.67	0.12
Demographics and other factors			
residence far	I(home is >2 miles from fire station)	0.35	0.40
work far	I(work is >2 miles from fire station)	0.51	0.25
age	age in years	38.61	47.99
male	I(male)	0.93	0.63
student	I(student)	0.08	0.04
married	I(married)	0.61	0.59
children <=12	I(young children at home)	0.39	0.64
children 13–18	I(older children at home)	0.26	0.53
<hs education	I(education < high school degree	0.08	0.05
hs education	I(high school degree)	0.35	0.25
> hs education	I(education beyond high school)	0.57	0.70
VT native	I(born in Vermont)	0.64	0.46
employed	I(currently employed)	0.92	0.76
income <15k	I(annual household income <15,000)	0.07	0.09
income 15-35k	I(annual household income 15-35,000)	0.16	0.20
income 35-50k	I(annual household income 35-50,000)	0.17	0.17
income 50-75k	I(annual household income 50-75,000)	0.24	0.22
income 75-100k	I(annual household income 75-100,000)	0.16	0.16
income >100k	I(annual household income >100,000)	0.20	0.16
wage (if employed)	hourly wage or, for salaried workers, imputed wage	17.42	22.92
donation	amount of household's charitable donations in past calendar year	469.18	799.39
Firefighter-specific variables			
presence of stipend	I(fire department pays hourly stipend for calls)	0.67	.
amount of stipend	amount of hourly stipend or, for departments that offer lump sum incentives, imputed hourly stipend	5.34	
call hours	Usual monthly training hours	10.28	
training hours	Usual monthly call hours	18.94	
n		217	189

Table 2: **IV probit models of selection into volunteer firefighting**

	Model 1		Model 2		Model 3	
	m.e.	s.e.	m.e.	s.e.	m.e.	s.e.
altruism (DG allocation)	0.0055***	0.0014	0.0045**	0.0018	0.0044*	0.0024
reputation (vanity plate)			0.1562*	0.0805	0.2163**	0.1047
career (factor score)			0.0747*	0.0442	-0.0037	0.0640
friends1 (make friends)			0.1456***	0.0531	0.2394***	0.0725
friends2 (friends on dept)			0.0225	0.0689	-0.1284	0.0972
extroversion (factor score)			0.0311	0.0377	0.0577	0.0541
risk (factor score)			0.1012***	0.0377	0.0162	0.0567
religious			0.1000	0.0676	0.1186	0.0974
family ff			0.2383***	0.0628	0.3086***	0.0879
invited			0.4814***	0.0559	0.5028***	0.0842
demographic controls	no		no		yes	
n	389		376		311	

Instrumental variables estimation of selection into volunteer firefighting. Instruments for *altruism* are *mother allocation* and *random participant allocation*. Demographic controls include age, gender, student status, marital status, children under age 12, children aged 12–18, education level, employment status, income, wage, Vermont native, annual charitable donations, and distance from residence and place of work to fire station. *$p<0.10$ **$p<0.05$ ***$p<0.01$.

Table 3: **IV regressions for log training and call hours**

	Call Hours		Training Hours	
	coef	s.e.	coef	s.e.
altruism (DG allocation)	-0.0021	0.0036	0.0106*	0.0058
reputation (vanity plate)	0.2929*	0.1661	0.0829	0.2219
career (factor score)	-0.1695	0.1446	-0.1033	0.1757
friends1 (make friends)	0.3905*	0.2000	0.1582	0.2169
friends2 (friends on dept)	-0.0546	0.2466	-0.1325	0.2527
extroversion (factor score)	-0.0960	0.0838	0.1367	0.1199
risk (factor score)	0.0992	0.0738	0.1432	0.1037
religious	-0.2174	0.1913	-0.2951	0.2194
family ff	0.1479	0.1605	-0.1391	0.1881
invited	0.0918	0.2475	0.3436	0.2650
demographic controls	no		no	
n	176		177	

Instrumental variables estimation of selection into volunteer firefighting. Instruments for *altruism* are *mother allocation* and *random participant allocation*. Top 1 percent of hours are dropped from analysis as large outliers. *$p<0.10$ **$p<0.05$ ***$p<0.01$.

Table 4: **Random effects linear probability models of call response**

	Model 1		Model 2		Model 3	
	m.e.	s.e.	m.e.	s.e.	m.e.	s.e.
Call characteristics						
spring	0.0086	0.0082	0.0056	0.0084	0.0005	0.0102
summer	0.0276***	0.0080	0.0269***	0.0082	0.0133	0.0099
fall	0.0348***	0.0082	0.0368***	0.0084	0.0197*	0.0101
weekend	0.0847***	0.0070	0.0842***	0.0072	0.1048***	0.0087
typical work hours (8-5)	-0.0834***	0.0064	-0.0913***	0.0066	-0.1000***	0.0080
late night (11-5)	-0.0421***	0.0106	-0.0374***	0.0109	-0.0211	0.0131
fire call	0.0839***	0.0085	0.0811***	0.0087	0.0954***	0.0106
calls in last week	-0.0016*	0.0008	-0.0017**	0.0009	-0.0022**	0.0010
Firefighter characteristics						
altruism (DG allocation)			-0.0002	0.0007	0.0005	0.0011
reputation (vanity plate)			0.1344***	0.0489	0.1583***	0.0575
career (factor score)			0.0414	0.0282	0.1022**	0.0410
friends1 (make friends)			-0.0245	0.0337	-0.0322	0.0464
friends2 (friends on dept)			-0.0368	0.0496	-0.0735	0.0578
extroversion (factor score)			-0.0055	0.0226	-0.0159	0.0250
risk (factor score)			-0.0250	0.0203	0.0014	0.0301
religious			-0.0722	0.0472	-0.1372**	0.0586
family ff			0.0719*	0.0398	0.0758	0.0487
invited			0.0866**	0.0430	0.0848	0.0649
department indicators	yes		yes		yes	
demographic controls	no		no		yes	
n	20058		19091		13112	

Random effects linear probability model of call response. Standard errors are robust. Demographic controls include age, gender, student status, marital status, children under age 12, children aged 12–18, education level, employment status, income, wage, Vermont native, annual charitable donations, and distance from residence and place of work to fire station. *p<0.10 **p<0.05 ***p<0.01

Table 5: **Random effects linear probability models of call response with interaction terms**

	Model 4		Model 5	
	m.e.	s.e.	m.e.	s.e.
Call characteristics				
spring	0.0008	0.0102	0.0007	0.0102
summer	0.0127	0.0099	0.0124	0.0099
fall	0.0190*	0.0101	0.0187*	0.0101
weekend	0.1047***	0.0087	0.1046***	0.0087
typical work hours (8-5)	-0.1002***	0.0080	-0.1003***	0.0080
late night (11-5)	-0.0215	0.0131	-0.0214	0.0131
fire call	0.0952***	0.0106	0.0951***	0.0106
calls in last week	-0.0022**	0.0010	-0.0022**	0.0010
calls in 2005	-0.0005***	0.0002	-0.0005***	0.0002
Firefighter characteristics				
altruism (DG allocation)	0.0008	0.0010	0.0007	0.0010
reputation (vanity plate)	0.3314***	0.1010	0.3250***	0.0999
career (factor score)	0.1306***	0.0374	0.1184***	0.0365
friends1 (make friends)	-0.0165	0.0415	-0.0077	0.0410
friends2 (friends on dept)	-0.0785	0.0563	-0.0725	0.0554
extroversion (factor score)	-0.0211	0.0242	-0.0255	0.0238
risk (factor score)	0.0060	0.0292	0.0098	0.0288
religious	-0.1376**	0.0552	-0.1354**	0.0543
family ff	0.0997**	0.0467	0.0862*	0.0465
invited	0.0671	0.0566	0.0584	0.0559
Stipend/Reputation interactions				
amount of stipend	0.0296***	0.0080		
amount of stipend*vanity plate	-0.0265**	0.0134		
presence of stipend			0.2165***	0.0626
presence of stipend*vanity plate			-0.2218*	0.1136
department indicators	no		no	
demographic controls	yes		yes	
n	13112		13112	

Random effects linear probability model of call response. Standard errors are robust. Demographic controls include age, gender, student status, marital status, children under age 12, children aged 12–18, education level, employment status, income, wage, Vermont native, annual charitable donations, and distance from residence and place of work to fire station. *$p<0.10$ **$p<0.05$ ***$p<0.01$