Self-Sacrifice for the Common Good under Risk and Competition

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Abstract

Public service-motivated individuals have a greater concern for the delivery of public services and for the societal consequence of collective inaction, seeing themselves play a pivotal role in upholding public goods. Such self-efficacy and perceived importance of public service jointly motivate individuals to commit to sacrificing for the common good. Using an incentivized laboratory experiment with 126 undergraduate and graduate students at a university in the Netherlands, we explore the association between self-reported Public Service Motivation (PSM) and voluntary self-sacrifice under different task characteristics and social contexts in a Volunteer’s Dilemma game. We find that risk-taking and intergroup competition negatively moderate the positive effect of PSM on volunteering. The risky situation may reduce an individual’s self-efficacy in making meaningful sacrifice, and intergroup competition may divert attention away from the concern for society at large to the outcome of the competition, compromising the positive effect of PSM on the likelihood to self-sacrifice for the common good.

Keywords: Public Service Motivation, lab experiment, altruism, intergroup competition, volunteering.
Introduction

Understanding what motivates people to take social responsibility and provide public services is central to public administration. According to Public Service Motivation (PSM) theory, certain individuals have a strong desire to make a personal sacrifice and serve the public interest (Perry and Wise 1990; Perry 1996). High PSM motivates individuals to volunteer and refrain from shirking by embedding an outcome-oriented concern for public welfare (Francois 2000). People may develop a strong motivation to contribute to public goods not merely because they feel compassionate about specific others’ wellbeing, but also because they are committed to the public interest in general (Perry and Wise 1990). The sense of self-sacrifice is fundamental to the behavioral process of PSM: Individuals are motivated to make personal sacrifice and serve the public interest in order to realize the instrumental, value-based, and identification motives of public service (Kim and Vandenabeele 2010).

We examine the effect of PSM across a series of treatments in a controlled laboratory environment, demonstrating how a specific task characteristic (risk) and social context (competition) can affect the role of PSM in stimulating self-sacrifice behavior (volunteering). We offer three contributions to extant knowledge. First, we add to the upcoming tradition of behavioral public administration by introducing and extending a well-established protocol from experimental economics known as the Volunteer’s Dilemma game. Second, we explore the potential impact of PSM on the act of volunteering in a strict experimental lab setting, associated with a noise-free environment and incentive compatibility. Third, we add two potential contingency variables that may moderate the impact of PSM on the likelihood of volunteering: risk and competition. Below, we provide much more detail regarding this set of three contributions, linking what we do to both the broader literature and real-world examples.
First, we introduce and extend a well-established experimental protocol from experimental economics, rooted in game theory and known as the Volunteer’s Dilemma, that is highly suited to study volunteering as an important and special case of pro-social behavior (Goeree, Holt, and Smith 2017). The Volunteer’s Dilemma experiment is a social dilemma game in which a public good is produced if and only if at least one player within a group volunteers to make a costly investment (Diekmann 1985). One volunteer suffices to produce a benefit for all, with the act of volunteering not being a free lunch for the individual deciding to do so. In this game, an individual faces the decision either to make a personal sacrifice to produce a public good, or to freeride in the hope that at least one other group member will decide to sacrifice. The Volunteer’s Dilemma serves as an ideal game for investigating the motivation of self-sacrifice in a lab experiment (Murnighan, Kim, and Metzger 1993).

Second, we experimentally study the effect of PSM on the likelihood of volunteering. With our focus on volunteering, we align with a tradition of empirical research that associated PSM with a wide variety of manifestations of prosocial behavior, including volunteer work, donating blood or money, and whistle-blowing (Clerkin, Paynter, and Taylor 2009; Coursey et al. 2008; Perry et al. 2008; Piatak and Holt 2020; Coursey et al. 2011; Lee and Jeong 2015). For instance, Clerkin, Paynter, and Taylor (2009) find that PSM can explain the decision to volunteer or donate among undergraduate students (but see Awan, Esteve, and van Witteloostuijn 2020). PSM is defined as a general predisposition to promote the public good, and act beyond personal and organizational interest (Vandenabeele 2007). The asymmetric pure strategy equilibrium in the Volunteer’s Dilemma characterizes the service-oriented and societal concern usually found in PSM: Individuals endowed with PSM often believe that there would be detrimental consequences for societal welfare were they not to volunteer to perform public service (Francois 2000). The perceived importance of public service and concern for collective inaction in tandem make individuals feel obligated to
volunteer, and to make a personal sacrifice to guarantee the delivery of public service. Hence, we may expect PSM to positively affect the likelihood of volunteering in a Volunteer’s Dilemma experiment.

Third, because service orientation and societal concern are subject to contextual and situational influences, we further extend the classic Volunteer’s Dilemma game to include two contingencies: (1) risk-taking and (2) intergroup competition. We selected this pair because of their prominence in real-life public administration, in which public service behavior is often risky (Osborne and Brown 2011), and where competition abounds (Warner and Hefetz 2008). As happens in real life, pro-social behavior not only involves personal sacrifice, but also often bears the risk of failure. Frequently, public decision-makers face the dilemma that they have to select alternatives among a risk spectrum. Risk may compromise the perceived importance of a volunteering task, and therefore the positive effect of PSM, by reducing the self-efficacy in producing a desired and meaningful outcome. Additionally, competition can serve as an extrinsic motivation with a positive effect on intra-group altruism, but diverting attention away from the concern for society at large to a performance target that crowds out a self-determined and intrinsic motivation such as PSM. By investigating the effect of PSM across a series of treatments in a controlled laboratory environment, we demonstrate how a specific task characteristic (risk) and social context (competition) affect the role of PSM in stimulating self-sacrifice behavior (volunteering).

Our paper is structured as follows. First, we develop a theoretical argument to produce one main effect (PSM) and two moderating effect (risk-taking and intergroup competition) hypotheses. Subsequently, we introduce our experimental Volunteer’s Dilemma design and empirical strategy, including instructions, measures and treatments. Next, we report our empirical findings. Finally, we conclude with a discussion, including a reflection on our contributions, as well as our study’s limitations and the associated future research opportunities.
Theoretical Framework

PSM, Self-Sacrifice, and the Volunteer’s Dilemma

The pure strategy equilibrium in the Volunteer’s Dilemma is asymmetric: Volunteering is a dominant strategy if other players will not volunteer. One feels the need to volunteer and make a personal sacrifice under the belief that other players will not volunteer, hence free-riders and cooperators co-exist in a stable equilibrium (Diekmann 1985; Holt 2019). As the Volunteer’s Dilemma only requires one member of the group to produce the public good, collective action by all is not only unnecessary, but also inefficient. This makes the Volunteer’s Dilemma very different from many other well-known social dilemma games. The Volunteer’s Dilemma does not require collective action to achieve a common good, unlike collective action problems such as the public goods games, the Prisoner’s Dilemma, and the common-pool resource problem (Goetze 1994). In collective action problems, mutual cooperation yields a better outcome, but defection is a dominant strategy, which gives a Pareto-inefficient equilibrium of mutual defection. The problem in the Volunteer’s Dilemma is different: Not in the aspect of how cooperation is sustained, but in who is willing to volunteer (influenced by individual differences) and how situational factors impact the willingness to volunteer (Krueger, Ullrich, and Chen 2016; Healy and Pate 2018; Fischer et al. 2011). By shifting the focus to this Volunteer’s Dilemma game, we contribute to the broader pursuit of examining the role of PSM in a variety of social dilemma games.

The Volunteer’s Dilemma is often used to describe the classic bystander phenomenon in which a bystander decides whether or not to help a victim in case of an emergency, but is less likely to do so with an increasing number of other bystanders. The Volunteer’s Dilemma is pervasive in many human interactions. Accepting task requests for work with low promotability (Babcock et al. 2017), sharing knowledge in organizations (Cabrera and
Cabrera 2002), and playing the role of devil’s advocacy to facilitate deliberation and avoid groupthink (Janis 1972, p. 215) all require a volunteer making a personal sacrifice for the common good. For instance, an untenured assistant professor willing to serve on the student’s committee, a coworker volunteering to participate in a seminar to bring new knowledge back to the organization, a group member voicing an unpopular view and critically challenging the majority position in a meeting, and a department’s manager stepping forward to be the first to experiment with organizational reforms. A well-functioning organization often relies on effective allocations of tasks and performance-based incentives to solve these and other manifestations of the Volunteer’s Dilemma.

In the public domain, street-level bureaucrats such as teachers, police officers, and welfare workers often see themselves as playing a pivotal role in providing citizens with public service that no-one else would be willing to provide (Lipsky 2010). This resembles a Volunteer’s Dilemma. Whistle-blowing serves as another vivid example: A whistle-blower may jeopardize her reputation, and even her entire public service career, so most bystanders would rather stay silent in the hope that others decide to blow the whistle. Many types of PSM-related behavior, such as volunteer work and blood donation, can be captured through the Volunteer’s Dilemma lens, because individuals usually do not expect direct reciprocity when performing these actions. This is very different in public goods games, in which reciprocation plays a key role in sustaining cooperation. Therefore, the Volunteer’s Dilemma game is an ideal setting for establishing the link between PSM and self-sacrifice behavior in a controlled laboratory experimental context.

Public organizations often rely on attracting individuals who are intrinsically motivated to make a personal sacrifice to deliver public services. Self-sacrifice forms the behavioral basis for the construct of Public Service Motivation (Kim and Vandenabeele 2010). Prior empirical work has linked PSM to different types of prosocial behavior, such as
volunteering and donating, all of which involve self-sacrifice. What differentiates PSM from altruism is that PSM moves beyond the concern of individual others, and involves motivating beliefs and attitudes regarding public service (Piatak and Holt 2020; Schott et al. 2019). Public service-motivated individuals are more concerned about the welfare of society and the delivery of public service, and they see themselves playing a pivotal role in providing this public service: They are committed to delivering public service that no-one else would be willing to provide, despite its benefits to society (Lipsky 2010; Francois 2000). People endowed with high PSM are outcome-oriented; they have a greater concern for the delivery of (public) services, and for the consequence of inaction for the welfare of others and society.

High-PSM individuals often believe that there would be detrimental consequences for societal welfare were they not to make personal sacrifices. This belief of playing a pivotal role exactly characterizes the asymmetric pure strategy equilibrium in the Volunteer’s Dilemma: Volunteering becomes a dominant strategy under the belief that other players will not volunteer. Individuals with higher PSM may feel more obliged to volunteer because they expect other members to be more reluctant to do so. Francois (2000) uses a principal-agent model to explain that such concern for collective inaction plays a key role for high-PSM people in achieving better efficiency in government bureaucracies vis-à-vis private enterprises. PSM motivates individuals to volunteer and refrain from shirking by embedding an outcome-oriented concern and self-efficacy that “were she not to provide the effort, the level of service would fall” (Francois 2000, p. 277). High-PSM individual’s self-efficacy and perceived importance of public service motivate this person to commit herself to contributing to society (Perry and Vandenabeele 2008). High-PSM individuals are willing to perform public service not only because they care about others’ individual welfare, but also because they believe in their pivotal role in delivering public service: They feel meaningful, obligated, and committed to making personal sacrifice and upholding public goods.
Hypothesis 1 (H1): PSM is positively associated with the voluntary provision of public goods in the Volunteer’s Dilemma game.

PSM and Risk-Taking

The literature on the role of PSM in enhancing prosocial behavior often focuses on risk-free and safe decisions such as donating money, time or blood. However, volunteering and public service delivery may well involve risk-taking (Dong 2015). For instance, a hospital doctor volunteers to treat patients with unknown but contagious diseases, a high school teacher intervenes in a very early stage to provide support for a student at risk of dropping out of school, and a whistle-blower decides to fight an uphill battle against corruption in a cover-up. Volunteering to share external knowledge, helping a victim, and adopting a trial reform could all turn out to be unappreciated, unsuccessful, and fruitless, and even harmful for the volunteering individual.

Frequently, empirical studies report public sector employees to be risk averse (Buurman et al. 2012; Bellante and Link 1981; Bonin et al. 2007; Carlsson, Daruvala, and Jaldell 2012; Dohmen and Falk 2010), and that risk-averse individuals tend to sort into public sector employment for reasons of job security (Dong 2017; Pfeifer 2011; Houston 2000). However, evidence for the relationship between PSM and risk attitude is mixed. On the one hand, in a laboratory experiment, Tepe and Prokop (2018) find that MPA students do not behave more risk averse than MBA and Law students, whereas PSM is positively associated with risk aversion. On the other hand, in a survey experiment sampling experienced managers, Nicholson-Crotty, Nicholson-Crotty, and Webeck (2019) find no evidence for a significant correlation between PSM and risk preferences.
Despite the lack of theory and evidence regarding the risk correlation of PSM, the PSM-associated personality trait “agreeableness” may provide a clue as to potentially relevant behavioral implications (van Witteloostuijn, Esteve, and Boyne 2016). On the one hand, agreeableness is the psychological trait that comes with being unselfishly cooperative, and is found to be positively correlated with risk aversion (Borghans et al. 2009; Soane and Chmiel 2005). On the other hand, the positive relationship between agreeableness and volunteering behavior is reported to be partially mediated by prosocial value motivation (Carlo et al. 2005; Vantilborgh et al. 2013). Combined, this suggests that the positive effect of PSM may be dampened in a risky setting. If PSM is positively associated with risk aversion, a high-PSM individual is less likely to engage in behavior s/he perceives as risky.

Additionally, we know that risk negatively affects an individual’s self-efficacy, which is the belief in one’s ability to produce desired effects by own actions (Bandura, Freeman, and Lightsey 1999; Gist and Mitchell 1992). Related, job-goal difficulty has an indirect negative effect on the public sector employees’ work motivation through its negative influence on perceived self-efficacy (Wright 2007, 2004; Perry and Vandenabeele 2008). Therefore, the presence of a risk of failure may compromise self-efficacy by making individuals feel that they cannot make meaningful and effective contributions, weakening the desire to serve the public (Wright and Grant 2010). In tandem with the earlier argument, risk may mitigate the effect of PSM on self-sacrifice for the sake of public good production.

**Hypothesis 2 (H2): Risk negatively moderates the positive effect of PSM on the voluntary provision of public goods in the Volunteer’s Dilemma.**
PSM and Competition

Competition can provide either direct monetary rewards, or self-worthiness that is contingent on external performance. Intergroup competition for scarce resources characterizes the human evolution of altruism (Choi and Bowles 2007; Brewer 1979; Bernhard, Fischbacher, and Fehr 2006), and lab experimental evidence reveals a positive effect of intergroup competition on intragroup cooperation. Laboratory studies employing intergroup competition for winning a group reward observe an increase in intragroup cooperation in the Prisoners’ Dilemma game (Erev, Bornstein, and Galili 1993; Bornstein and Ben-Yossef 1994; Gunnthorsdottir and Rapoport 2006; Halevy, Bornstein, and Sagiv 2008; Bornstein, Erev, and Rosen 1990), coordination game (Bornstein, Gneezy, and Nagel 2002), and public goods game (Rapoport and Bornstein 1989; Sääksvuori, Mappes, and Puurtinen 2011; Tan and Bolle 2007; Puurtinen and Mappes 2008; Cárdenas and Mantilla 2015).

Introducing choice and competition into the public sector is often considered as a strategy to encourage service providers to innovate, and to improve quality, efficiency, and responsiveness (DeLeon and Denhardt 2000; Kim 2010; Morris and Jones 1999). However, such a policy rationale is based on the assumption of self-interest and profit-maximization, which could compromise intrinsic motivation (Grand 2010). Bénabou and Tirole (2006) show that competition can lead to excessive participation in types of prosocial behavior that are highly visible, but not really beneficial. Therefore, the locus of control may shift from the inside to the outside of the person affected: Attention may divert from the concern for others or society at large to the outcome of competition. If so, competition crowds out intrinsic motivation, of which PSM is a prominent manifestation.

Motivation Crowding Theory demonstrates that performance-based incentives can reduce intrinsic motivation, either through a change in preferences, a shift in the perception of the performed task or task environment, or a signal about the principal’s social preference.
Exogeneous market-like schemes may endorse moral disengagement and self-interested behavior by providing cues for appropriate behaviors, and may compromise individuals’ self-determined motives by making these individuals feel being monitored and controlled [see Bowles and Polania-Reyes (2012) for a review]. Therefore, external incentives (rewards/punishments) could lead to demoralization of public service, instead extrinsically promoting self-interested behavior among employees who are intrinsically motivated by PSM (Grand 2010; Georgellis, Iossa, and Tabvuma 2011; Perry and Hondeghem 2008; but see Stazyk 2013).

Extrinsic motivation includes not only concerns for money, but also for recognition, competition, evaluation, and other intangible incentives (Amabile et al. 1994). Competition may serve as an external, performance-based incentive that crowds out intrinsic motivation and moral behavior. Deci et al. (1981) find in an experiment that trying to win over others makes individuals focus on the goal of winning rather than on the process of doing the activity well, decreasing intrinsic motivation similarly as other extrinsic rewards. Market-like competition for survival is also found to crowd out the fairness concern in an Ultimatum Game experiment, making individuals more willing to propose and accept unfair offers (Schotter, Weiss, and Zapater 1996).

Self-Determination Theory (Ryan and Deci 2000) explains the motivational change mechanisms associated with external stimuli. The theory offers insight into the crowding-out effect of extrinsic motivation by differentiating different sources of motivation based on the extent to which the motives are self-determined and integrated into the self. PSM includes both intrinsic and extrinsic motivation (Houston 2011; Neumann and Ritz 2015). On the one hand, intrinsic motivation can be enjoyment-based or purely prosocial: People may have fun performing public service because they can accumulate new knowledge, interact with people,
or derive meaning from being benevolent and kind by helping others. On the other hand, PSM has extrinsic components that are driven by external stimuli: Individuals may voluntarily perform public services because the tasks are instrumental to advance their ultimate goals (identified regulation), or because they integrate duties and obligations into their value system or identity (integrated regulation).

However, the extrinsic components of PSM are still autonomous and integrated into the self, implying that PSM involves a higher reliance on intrinsic over extrinsic rewards (Houston 2000, 2011; Crewson 1997). Therefore, PSM may be subject to a crowding-out effect from performance-contingent competition, which serves as external regulation and engenders the aspiration to attain a desired outcome or to avoid a threatened consequence. Again, attention may divert from the concern for others or society at large to the outcome of the competition, reducing the perceived importance of public service and crowding out PSM.

**Hypothesis 3 (H3): Competition negatively moderates the positive effect of PSM on the voluntary provision of public goods in the volunteer’s dilemma.**

In our theory above, we engaged with arguments associated with all four traditional PSM dimensions: Compassion (COM), Attraction to Public Services (APS), Commitment to Public Values (CPV), and Self-Sacrifice (SS). We focused on a unidimensional conception of PSM in our theory, and refrained from formulating ex ante hypotheses for the four PSM dimensions, as we do not have any theoretical prior to predict effect differences across the four dimensions. However, we have another contribution to make by, in post hoc exploratory analyses, empirically examining the effect of the four dimensions separately, to see to what extent this reveals different (patterns of) results.
Experimental Design

The baseline model (the control treatment, or CT) is a standard Volunteer’s Dilemma, where players decide whether or not to incur a personal cost to provide a public good, which gives a lump-sum payment to each member of a group (Diekmann 1985). We vary treatments across our two contingencies to examine the effect of risk-taking (RK treatment) and intergroup competition (GC treatment). The first contingency introduces the risky production of public goods, with a 50% chance of failing to produce a public good. The second contingency relates to an intergroup competition treatment, where two groups compete for a public good sequentially: A group with one or more volunteers wins a public good against another group with no volunteer. There is a 50% chance of winning in case of a tie, when both groups have at least one volunteer. Sequential moves result in three subgame groups: The first-mover group GC-Lead decides in the first stage, and the second-mover group plays GC-CT or GC-RK, with a payoff structure identical to CT and RK, respectively. An overview of the resulting treatments is provided in Table 1. Instructions for the treatments and illustrations of game trees are included in Appendix B.

[Table 1]

To avoid any subjective bias due to contextual priming, optimally benefiting from a noise-free lab environment, we use the abstract operationalization of the public good that is standard in the behavioral and experimental economics literatures, as the additional monetary value delivered to all group members if at least one decides to volunteer (Plott and Smith 1995). In doing so, we take care of incentive compatibility, implying that all participants are subject to actual material incentives to optimally speak to their willingness to really act, rather than to only express hypothetical behavior without any material consequences (van Witteloostuijn 1995). The key characteristics of this abstract operationalization nicely match
with those of real-world volunteering and public good delivery in the sense that one individual may voluntarily decide to act, and bear the cost of doing so, to produce a collective benefit.

The Control Treatment (CT): The baseline

Each player within a group of $N$ participants decides whether or not to make a personal sacrifice $C$ to volunteer to produce a public good. Everyone receives a high payoff value of $V$ if at least one player volunteers, and a lower payoff $L$ otherwise. If more than one player decides to volunteer, this does not generate any additional value. As $V - C > L$, all players choosing not to volunteer cannot be a Nash equilibrium. There are many asymmetric pure strategy equilibria in which one group member volunteers while the other group members do not. In such an equilibrium, the volunteer may believe that the public good will not be produced if s/he does not volunteer.

Since the asymmetric equilibrium in pure strategies requires coordination, most research on one-shot Volunteer’s Dilemma games focuses on the symmetric Nash equilibria in mixed strategies. Here, each player volunteers with a certain probability, with a positive marginal effect from the value of the public good ($V - L$), and a negative marginal effect from the cost of volunteering ($C$). The equilibrium tendency to volunteer is a decreasing function of group size, which is known as the “bystander effect” or “diffusion of responsibility” from the social psychology literature (Diekmann 1985; Goeree, Holt, and Smith 2017).
Risk Treatment (RK): Risky volunteering

The RK treatment is similar to the CT treatment except that there is a 50% chance of producing a public good with value $V$. Volunteers have to accept the risk that their contributions may not pay off. Although comparative statics under risk neutrality remain equivalent to the analysis of the CT treatment, risk attitudes can now affect the equilibrium outcomes by trading off two types of risks: The risk of no volunteering, and the risk of unsuccessful volunteering. The risk of no volunteering encourages risk-averse players to volunteer more than risk-neutral players in order to avoid the consequence of collective inaction, which is also the case in the CT treatment. By contrast, the risk of unsuccessful volunteering induces risk-averse individuals to not volunteer and secure their endowment ($L$). In the RK treatment, individuals trade off these two risks when making risky decisions, so the relationship between risk aversion and risky volunteering has an inverted-U shape. Unlike in the CT treatment, where risk-averse players tend to volunteer more, highly risk-averse individuals would rather lose the chance to produce a public good than take the risk of unsuccessful volunteering in the RK treatment, exhibiting a lower volunteering rate than with risk-neutral players.

Intergroup Competition Treatment (GC)

In the GC treatment, two groups (Team A and Team B) play a Volunteer’s Dilemma game within each group and compete for a winner-takes-all prize with the other group, which gives the value of $V$ to each member of the winning group. For each group, the probability of winning depends on whether or not at least one member decides to volunteer. One group can win the prize for sure if the group has at least one volunteer, while the other group has not. If both groups have at least one volunteer, then the winning chance is 50 percent. We make the competition sequential. Members of Team A move first in stage 1, deciding whether to volunteer or not. In stage 2, members of Team B can decide to volunteer or not, contingent on
stage 1’s outcome. Sequential moves provide the opportunity to design corresponding treatments that are identical to the subgame of the second stage, as illustrated in Figure 1. If no first mover volunteers, the subgame of the second movers (GC-CT) is identical to the CT treatment: The probability of winning the prize is 1. If at least one first mover decides to volunteer, the subgame of the second movers (GC-RK) is identical to the RK treatment: Two groups have an equal 50 per cent chance of winning the prize.

[Figure 1]

The set-up not only maintains the intragroup structure of a social dilemma, but also makes the payoff structure identical between two subgames of the GC treatment (GC-CT or GC-RK) and the single group treatments (CT or RK treatment). Hence, we can isolate the exact motivational effect of intergroup competition on self-sacrifice behavior while keeping the payoff structure intact, unlike prior studies on intergroup competition and prosocial behavior where the intergroup competition treatment introduces a collective consequence that impacts the intragroup payoff structure and the expected benefit of cooperation.

Experimental Procedures and Data

Experimental Procedures

We conducted the experiment in the CentERlab at Tilburg University in the Netherlands.¹ We invited 126 undergraduate and graduate students between September and November 2018. Participants were divided into seven sessions, and were given written instructions. The number of participants per session ranges from 12 to 24, but always with a multiplier of 3. Before the experiment, all participants were asked to participate in a ten-minute online survey, measuring PSM. All participants first participated in the Holt-Laury risk task to

¹ The procedure of the experiment was examined and approved by CentERlab, and abides by the ethical rules of using human subjects in research. The experiments were conducted following the procedures established by Tilburg University’s CentERlab. Our study went through an open peer review meeting that is mandatory for all scholars wishing to use the CentERlab facilities.
measure their risk aversion (Holt and Laury 2002), and subsequently in the CT treatment in ten consecutive decision periods. Afterwards, 48 participants of three sessions played the RK treatment in ten consecutive decision periods, and the other 78 participants of four sessions played the GC treatment in ten consecutive decision periods. All experimental sessions were in English. To make sure that they understood the game, participants had to correctly answer test questions before making their decisions.

Participants were randomly assigned to a group of three \((N = 3)\). The GC treatment employs stranger matching with fixed roles: The role assignment into Team A (leaders) or B (followers) is fixed throughout the entire treatment. We employ the strategy method for Team B to collect more observations at two decision nodes (whether someone in Team A volunteers or not). Fischbacher, Gächter, and Quercia (2012) find that the strategy method often produces results consistent with the direct response method in games involving voluntary cooperation. Across all treatments, the benefit to every group member when the public good was attained is €12 \((V = 12)\), and the personal cost of volunteering is €2 \((C = 2)\) for each volunteer. When the public good was not attained, each group member earned €4 \((L = 4)\). To avoid a framing effect (people tend to value options that are framed positively), we describe the decision to volunteer in the written instructions as the decision to “invest,” and the public good production as “an investment” that makes that all group members receive an extra earning. There was no feedback to participants on the number of volunteers. Participants were only informed after each round about the binary outcome of public good production (whether or not one or more people in the own group invested), the outcome of the lottery in the RK treatment, and the outcome of the team competition in the GC treatment.

We used z-Tree (Fischbacher 2007). Participants received their pay-out of one randomly drawn game from the 20 decision rounds, plus the pay-out of the Holt-Laury risk task. This guarantees incentive compatibility. The experiment lasted approximately 50
minutes (including instructions), and participants earned about €12, on average, paid in cash at the conclusion of the experiment.

Subject Pool

All experiments were conducted with the informed consent of healthy adults who were free to withdraw from participation at any time. Only individuals who voluntarily entered Tilburg University’s experiment recruiting database were invited, and informed consent was indicated by electronic acceptance of an invitation to attend an experimental session. Participating in lab experiments is standard practice on Tilburg University’s campus, both in the context of mandatory activities within degree programs, and as voluntary participation on a fee basis. In our experiment, 54.8% of recruited participants are undergraduate students, and 45.2% are graduate students – all participating voluntarily on a fee basis. By far the majority of the recruited students were from the social sciences and humanities: business and management (42.1%), economics (27.8%), psychology (15.1%), other social sciences (3.2%), and applied sciences (5.7%).

A student sample brings along ideal characteristics for the current study. As students are not yet deeply socialized by an institutional working environment, we are able to test the impact of PSM as a more general psychological attitude or trait absent of any impetus from years of working life. Accordingly, next to an abstract description of the game setup to avoid framing effects (verbal framing), we limit the broader set of social contexts (social framing) by using a student sample.
Variables

**Dependent variable: Volunteering decisions.** Our dependent variable is a yes-or-no (1 or 0) volunteering decision dummy for each individual in each round, for each session in each treatment. We have 128 participants playing 10 rounds of the CT treatment, 48 participants the RK treatment, and 39 participants the GC-CT or GC-RK treatment, respectively. The observations in the GC treatment of the leading group (Team A) are dropped from further analyses since the GC-Lead treatment is not the focus of our study.

**Explainable variable: PSM.** We work with Perry's (1996) multidimensional concept, comprised of four dimensions: APS, CPV, COM, and SS. We take Kim et al.'s (2012) international scale (16 items) to measure PSM on a seven-point Likert-type scale. The Composite Reliability (McNeish 2018) is $\omega$ (total) = 0.84 for the overall PSM scale (referred to as PSM Overall), and $\omega = 0.67$ for COM, $\omega = 0.70$ for APS, $\omega = 0.56$ for CPV, and $\omega = 0.78$ for SS. The composite reliability is similar to the one reported in Kim et al. (2012) (ranging from 0.716 to 0.824) for overall PSM, APS, and SS, but lower for CPV.

**Control variable: Risk Aversion.** In the Holt-Laury risk task, our 128 participants are given a set of paired lottery options. These pairs are structured so that the lesser payoff in the safe Option A is always worth more than the lesser payoff in the risk Option B (i.e., the high payoff in Option A is €3 and the low payoff is €2, whereas the high payoff in B is €5 and the low payoff is €1; see Appendix B.1). Participants make ten decisions to choose between Options A and B, with the chance of the high payoff varying from 10% to 100%. Participations who are more risk averse will pick Option A over B unless the chance of getting the high payoff is large enough. The number of safe options A selected in the ten

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2 Cronbach’s $\alpha$ of the overall PSM scale is $\alpha = 0.84$, and $\alpha = 0.66$ for COM, $\alpha = 0.70$ for APS, $\alpha = 0.56$ for CPV, and $\alpha = 0.76$ for SS. All the reported estimates of internal consistency reliability assume that items can be measured in interval levels.
lottery options indicates the level of risk aversion (centered at three choices, or risk-neutral individuals).

**Other control variables.** In line with prior experimental PSM work (Esteve et al. 2016; Prokop and Tepe 2020), we include three person-related control variables: gender (female as baseline, male, and the third gender), age (in years), and risk aversion (see above). For the per-period regression analyses, we include two game-related control variables: experience (the number of rounds played), and previous win (whether the group won or successfully produced a public good in the previous round). We decided not to control for whether the participant is an undergraduate (Bachelor) or graduate (Master) student, as this dummy perfectly correlates with age in the Dutch university system.³

Results

Descriptive Statistics

We observe that 54.0% of participants are female and 45.2% are males, with an average age of 22.6 (s.d. = 3.20; see Table A.1 in online Appendix for the summary statistics and bivariate correlations). The mean of the Holt-Laury risk task is 4.72 and the majority (71.42%) is risk averse (Table A.2). We do not find risk aversion to be significantly correlated with PSM Overall ($\rho = -0.018$, $p = 0.159$).

[Tables 2 and 3]

Table 2 provides the average rate of volunteering by sessions, treatment averages, and the Nash equilibria across treatments. The observed average volunteering rate is 46% when no risk and intergroup competition are involved, which is slightly below the Nash

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³ Indeed, decisions in our experiment are not driven by participants’ major study. Robustness checks deliver no evidence for any heterogeneity in participants’ decisions attributable to degree program.
equilibrium. When producing the public good is risky, the volunteering rate drops to 33%, as predicted by the Nash equilibrium. Intergroup competition increases the volunteering rate by around 10%, either with or without risk, above the Nash equilibrium.

[Table 2]

Regression Analysis

We only have seven independent observations, since all participants in one session were connected. Because there could be substantial variation in volunteering across sessions resulting from random stranger matching within each session, we generalize the error structure to include heteroskedastic variances across individuals and sessions. We employ a mixed-effects (ME) linear model with repeated measures. The 2×2 treatment effects are modeled as binary fixed effects, and sessions and participants within each session are modeled as random effects. Table 3 reports regression estimates to examine the effect of PSM on volunteering across the respective treatments, and Table 4 provides regression estimates for the PSM subscales.4

[Tables 3 and 4]

The dependent variable in Models 1, 2, and 3 is the average volunteering rate across ten rounds for each observation. In Models 4 to 9, the dependent variable is the binary volunteering decision (1 = to invest/volunteer) in each round.5 Models 4 to 9 control for experience and previous win. The explanatory variable is PSM Overall in Models 2 to 5, and

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4 Since the PSM subscales show very high pairwise correlation, we estimate separate regression models for each PSM subscale.

5 We find no significant time trend for the volunteering decision across treatments. The Spearman’s rank correlation test gives: ρ = −0.042, p = 0.140 in the CT treatment; ρ = −0.005, p = 0.906 in the RK treatment; ρ = −0.036, p = 0.476 in the GC-CT treatment; and ρ = −0.018, p = 0.723 in the GC-RK treatment.
the four PSM subscales in Models 6 to 9. Models 3 and 5 to 9 allow for heterogeneous effects of PSM or its subscales across treatments (so the non-interacted PSM variable only represents the effect of PSM on baseline volunteering in the CT treatment). All models control for gender, age, and risk aversion. The full regression model of Model 5 to 9 is:

\[ y_{ist} = \beta_1 PSM_i + \beta_2 PSM_i \times (GC_t/RK_t) + \beta_3 (GC_t/RK_t) + \beta_4 X_i + \beta_5 X_t + \alpha + \alpha_t + \alpha_s + \epsilon_{ist}. \]

The dependent \( y_{ist} \) is either the average volunteering rate in Models 1-3 or the likelihood to volunteer in Models 4-5. The coefficient \( \beta_1 \) measures the PSM (fixed) effect on baseline volunteering in the CT treatment. \( GC_t \) and \( RK_t \) are the indicator for intergroup competition and risky production: \( \beta_2 \) reflects the heterogeneous effect of PSM on volunteering in the treatment \( RK \) (\( RK_t = 1, GC_t = 0 \)), \( GC-CT \) (\( RK_t = 0, GC_t = 1 \)), and \( GC-RK \) (\( RK_t = 1, GC_t = 1 \)), coefficient \( \beta_3 \) gives the treatment fixed effects (with the CT treatment as the baseline), \( X_i \) are individual-specific controls, \( X_t \) period-specific controls, \( \alpha, \alpha_t, \) and \( \alpha_s \) the constant terms and individual and session-specific random effects, and \( \epsilon_{ist} \) is the error term.

We observe treatment fixed effects across models, even when PSM variables are included. Across models, group competition increases the volunteering rate or likelihood by 13-15%, while risky production decreases the volunteering rate or likelihood by 12-14%, consistent with the theoretical prediction. Intergroup competition can mitigate the negative impact of risk and maintain the volunteering rate: The estimated coefficient difference between \( RK \) and \( GC-RK \) is significant (from mildly to strongly across models; test statistics are shown in the last row of Table 3).

PSM is significantly positive in Model 2 (weakly, \( p = 0.058 \)) and Model 4 (moderately, \( p = 0.043 \)). When including treatment heterogeneity in PSM in Models 3 and 5, both the effect size and significance of overall PSM on baseline (the CT treatment) volunteering increases substantially (\( p = 0.006 \) and \( p = 0.005 \)). Table 5 reports the average marginal effect
of PSM and its subscales across treatments from the linear prediction of Models 5 to 9. For example, in Model 5, the average marginal effect of PSM on volunteering in the CT treatment is significantly positive at 11.9% (1 unit or 1.67 s.d. increase in the level of PSM increases the likelihood to volunteer by 11.9%, \( p = 0.005 \)). This delivers robust support for Hypothesis 1.

[Table 5]

The effect of PSM varies across treatments. The interaction terms between PSM Overall and other treatments are negative, suggesting that these three treatments negatively moderate the effect of PSM on volunteering. In Model 5, the interaction terms are weakly significant for the GC-CT and RK treatment (\( p = 0.099 \) and 0.090), and moderately significant in the GC-RK treatment (\( p = 0.032 \)). The average marginal effects of PSM Overall in the GC-CT, RK, and GC-RK treatments (Table 5) are also not significant (\( p = 0.672, 0.481, \) and 0.995). Figure 2 shows the predicted probability of volunteering using Model 5 at different levels of PSM across treatments: An upward-sloping relationship is found in the CT treatment, but not ostensibly so in the other three treatments. The positive effect of PSM disappears when the public good production involves risk and competition, supporting Hypotheses 2 and 3.

COM and APS have a strongly significant and positive effect on volunteering in the CT treatments (\( p = 0.014 \) and \( p = 0.008 \) in Table 4), SS is weakly significant and positive (\( p = 0.061 \)), and CPV is insignificant (\( p = 0.195 \)). In Table 5, COM, APS, and SS have a significantly positive average marginal effect on volunteering in the CT treatment; although only weakly significant, the positive marginal effect is also found for COM in the RK treatment (\( p = 0.070 \)). No significant marginal effect can be seen in the treatments GC-CT and GC-RK for any PSM subscale. In Table 4, we note that risk and competition negatively moderate the effect of specific PSM subscales: GC-RK negatively moderates the effect of
COM and APS ($p = 0.057$ and $p = 0.013$), RK negatively moderates the effect of SS ($p = 0.002$), and GC-CT negatively moderates the effect of CPV ($p = 0.047$).

**Discussion and Conclusion**

The self-efficacy and perceived importance of public service motivates individuals to self-sacrifice for the collective good. PSM has a positive impact on individual productivity, organizational effectiveness, and organizational citizenship (Ritz 2009; Ritz, Brewer, and Neumann 2016). For instance, public employees with high PSM tend to refrain from slacking without monetary incentives (Francois 2000), accept task requests with low promotability or verifiability, and collaborate more effectively within the organization and with external actors. What distinguishes PSM from other types of prosocial motivation is the orientation towards public service and the concern for society at large (Piatak and Holt 2020). High-PSM individuals are aware of their potential contribution to society through public service delivery (Schott et al. 2019). Because high-PSM individuals believe in their pivotal role of upholding the common good and societal welfare, they reveal a greater concern for the consequence of collective inaction, and develop an inherent interest to contribute to the public good by performing public service (Francois 2000).

Laboratory experimental research on PSM and different types of prosocial behavior is emerging. Using a survey in combination with a pseudo-experimental design, Esteve et al. (2016) observe a positive relationship between PSM and contributions to the public good, but such relationship is found to be reciprocal, being moderated by prosocial behavior of the others. Similarly, individuals with higher PSM are reported to be more altruistic (contributing more) and more likely to undertake altruistic punishment (punish free riders more) in public goods games (Prokop and Tepe 2020). However, Tepe and Vanhuysse (2017) do not find
PSM to be associated with a higher contribution in public goods games. PSM has also been found to be linked to an equal division in the Dictator Game, less strategically fair behavior in the Ultimatum Game (Tepe and Vanhuysse 2017), cooperation in the Prisoner’s Dilemma setting (Esteve, van Witteloostuijn, and Boyne 2015), and trust behavior in the Trust Game (Tepe 2016). In all, in lab experiments, people with higher PSM are reported to be more generous, more trustworthy, and more willing to contribute to public goods.

In line with prior incentivized laboratory experiments regarding the behavioral implications of PSM, we observe a strong relationship between PSM and prosocial behavior in a classic Volunteer’s Dilemma game. The latter represents an abstract and context-free manifestation of real-world examples of volunteering, such as blood donation, volunteer work, and whistle-blowing. The main effect of PSM is positive, implying that high PSM is positively associated with the likelihood to step forward as the volunteer. However, we also find that two critical contingencies dampen this positive effect substantially: risk-taking and intergroup competition. As we will discuss below in greater detail, this two-fold finding can have serious consequences for the practice of public administration.

Disassembling PSM into its subscales shows that Compassion (COM) and Attraction to Public Services (APS), reflecting affective and rational motives, are the main drivers of PSM-motivated self-sacrifice behavior in our Volunteer’s Dilemma context, whereas Self-Sacrifice (SS) has only a weakly positive relationship with the likelihood to sacrifice. At first sight, the weak effect of SS on self-sacrifice behavior may be seen as counter-intuitive. Importantly, however, this finding shows that PSM captures much more than simply the attitude to sacrifice or altruism: Other motivations and predispositions matter in predicting prosocial behaviors as well (Platak and Holt 2020). COM can trigger a greater concern for the broader consequence of collective inaction, and APS may enhance the self-perceived importance of public service. In contrast, SS may not be an effective motivation if the target
of self-sacrifice behavior is not a specific other, but rather a ‘faceless’ group of others, as is the case in our Volunteer’s Dilemma setting with stranger matching. In such a setting, the more abstract sense of the common good is what matters more.

Similarly, Prokop and Tepe (2019) find that COM and APS play the main role in driving cooperative and punitive behaviors in the public goods game with punishment. Intriguingly, both cooperative and punitive behaviors in the public goods game can be seen as volunteering, very similar to the voluntary provision of public goods in the Volunteer’s Dilemma. First, theoretically speaking, the Volunteer’s Dilemma is an extreme case of a general public goods game (with a step-level contribution function) in which cooperators and defectors can co-exist without iterations, relatedness, or external enforcement (Archetti and Scheuring 2011). Second, altruistic punishment requires volunteers to make a personal sacrifice to punish norm violators, which too resembles a Volunteer’s Dilemma game (Przepiorka and Diekmann 2013). Whistle-blowing serves as an ideal example, connecting self-sacrifice and punitive behavior together. The public good that a volunteer is providing is social norm enforcement. Given all this, we suggest that future work further examines this potential explanation for the different behavioral effect of PSM’s dimensions.

Although we do not find PSM to be associated with risk preferences, our results indicate that the positive effect of PSM on self-sacrifice disappears when the performed task involves risk-taking. This implies that task characteristics can moderate the PSM effect, in this case by lowering PSM’s impact. A risk of failure may compromise an individual’s self-efficacy of making meaningful and effective contributions, thereby weakening the effect of PSM, and SS in particular. This relationship resonates with expectancy theory, introduced by Vroom (1964). This theory describes how individuals make choices based on their estimate of how likely a given behavior leads to the desired outcome. In this spirit, our results imply that PSM alone is ineffective in stimulating prosocial behavior under risk. However,
compassion is observed to be less vulnerable to risk and uncertainty: COM still has a mild positive marginal effect on prosocial risk-taking. For PSM to promote prosocial risk-taking, individuals may need to develop a strong sense of compassion, or even be assured that the risks they take will pay off in the long run and will not be in vain (Mesmer-Magnus and Viswesvaran 2005, p. 289). For example, the positive relationship between PSM and whistle-blowing, an exemplary type of prosocial risk-taking, is found to be indirect and mediated by organizational commitment (Caillier 2015). Since risk-taking is linked to public service innovation (Brown and Osborne 2013), and inherent to the high-risk sectors such as police, health, and social service (Vincent 1996), we encourage future studies to investigate risk perception, self-efficacy, and their behavioral relationship with PSM by analyzing whistle-blowing behavior, innovative behavior, or risk-taking in high-risk sectors.

Moreover, team competition increases the volunteering rate, but also crowds out the positive effect of PSM, implying that PSM can be strengthened or undermined by the institutional context. On the one hand, as a more self-determined motivation, PSM promotes the voluntary provision of the public good through the societal concern and the perceived importance of public service, or the care for a broader community or group. On the other hand, competition serves as a performance-related incentive, diverting attention away from any intrinsically motivated impetus to a performance target that is being evaluated, which could compromise the role of PSM in stimulating desirable behaviors. The current study provides first laboratory evidence that a controlled motivation strategy such as intergroup competition crowds out PSM-motivated self-sacrifice behavior. This points to another promising line of future research, as more work is needed to deepen our understanding of crowding out and in, both in the lab and in the field.

Furthermore, we observe that the presence of risk and competition together mitigates the effect of PSM, particularly COM and APS, more than does either one of both factors in
isolation. Since competition often involves some degree of risk, public managers should take crowding-out and risk-taking into account when designing incentive systems, particularly for tasks and jobs that are inherently tied to prosocial motivations. In times of budget restraints and fiscal austerity, public organizations and their managers often turn to nonmonetary incentives to stimulate desirable behavior. Introducing nonmonetary incentives such as competition may not only make service providers compete for performance indicators, such as the amount of service and time of delivery, but might also divert their concern away from societal welfare, or might lower their self-efficacy of achieving a meaningful outcome.

Like any other experimental research on PSM, this study cannot establish a direct causal link between PSM and prosocial behavior, because we cannot manipulate the independent variable PSM as a persistent individual attitude or trait with the random assignment (Esteve et al. 2016). However, the treatment intervention does allow establishing causal inference with regard to the moderating role of two contextual factors: risk and competition. Another restrictive remark regards the external validity of laboratory experiments. Conducting an experiment in a highly controlled environment is very effective in abstracting from naturally occurring confounds, hence substantially increasing the internal validity of a study. This is why, following the classic guidelines well-established in behavioral and experimental economics (see Plott and Smith 2008), we work with a noise-free abstract operationalization of volunteering in an incentive compatible design. Although this abstract notion of volunteering is associated with the key characteristics of real-world volunteering (i.e., an individual voluntarily acting to benefit the group, bearing the cost of doing so), the lab context may also involve abstraction from the important complexity of the social environment, and may not capture the precise effect size we would otherwise expect to see outside a laboratory (Schram 2005). For instance, the observed main drivers of COM and
APS for prosocial behaviors in Prokop and Tepe (2019) and in our experiment might be overrated if CPV needs to be activated under certain social conditions.

According to Self-Determination Theory, COM and APS are closer to the intrinsic motivations through the satisfaction of helping people and the enjoyment of performing public service. Commitment to Public Values (CPV), instead, is less self-determined, requiring a certain level of cultural assimilation and social identification. Further research may explore other contextual factors in laboratory and field experiments to identify the role of PSM’s subdimensions in stimulating prosocial behaviors. Such inquiry will be essential to deepen our understanding of the behavioral implications of PSM. Also, the participants in this study are students with an average age of 22.6. Shifts in risk-taking across the adolescence and adult life span (Rolison et al. 2014; Duell et al. 2018; Steinberg 2008), and professionalism may be other factors driving individuals towards prosocial risk-taking (Berman and West 1998). We encourage future study to explore prosocial risk-taking among elder populations and professionals, and investigate the role of institutional socialization in affecting self-regulation and prosocial behavior.

**Data Availability Statement**

The data underlying this article are available in the Data Archiving and Networked Services (DANS) at https://doi.org/10.17026/dans-zqw-rj7j.
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Table 1. Summary of treatments

| Treatment acronym | Single Group Production | Intergroup Competition |
|-------------------|-------------------------|------------------------|
|                   | No Risk | Risk | No Risk | Risk | Risk |
| CT                |          |      | GC-CT   |      |      |
| RK                |          |      | GC-RK   |      |      |
| GC-CT             |          |      | GC-Lead |      |      |

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Table 2. Rate of volunteering

| Treatment          | $CT$               | $RK$               | $GC-CT$             | $GC-RK$             | $GC-Lead$            |
|--------------------|--------------------|--------------------|--------------------|--------------------|----------------------|
| No-Risk, single group | 1, 2, 3, 4, 5, 6, 7 | 1, 4, 5            | 2, 3, 6, 7         | 2, 3, 6, 7         | 2, 3, 6, 7           |
| Risk, single group  | 0.49, 0.38, 0.50, 0.58, 0.33, 0.53, 0.44 | 0.33, 0.33, 0.31 | 0.5, 0.58, 0.48, 0.76 | 0.44, 0.38, 0.42, 0.5 | 0.37, 0.38, 0.37, 0.28 |
| Risk, intergroup, second mover | 0.5 | 0.58 | 0.76 | 0.43 | 0.35 |
| Risk, intergroup, first mover | 0.5 | 0.5 | 0.5 | 0.29 | 0.51 |
| Session Average    | 0.46               | 0.33               | 0.58               | 0.43               | 0.35                 |
| Treatment Std. Err.| 0.029              | 0.038              | 0.056              | 0.054              | 0.049               |
| Nash Equilibrium   | 0.5                | 0.29               | 0.5                | 0.29               | 0.51                |
Table 3. Regression results: PSM Overall.

|                  | (1) Treatment Average | (2) Treatment Average | (3) Treatment Average | (4) Decision per round | (5) Decision per round |
|------------------|-----------------------|-----------------------|-----------------------|------------------------|------------------------|
| **PSM Overall (centered)** | 0.075* | 0.128*** | 0.082** | 0.119*** |
|                  | (0.058) | (0.006) | (0.043) | (0.005) |
| ×GC-CT           | 0.139*** | 0.146*** | 0.128*** | 0.160*** | 0.147*** |
|                  | (0.007) | (0.004) | (0.014) | (0.000) | (0.000) |
| × RK             | -0.140*** | -0.139*** | -0.135*** | -0.127*** |
|                  | (0.003) | (0.002) | (0.003) | (0.000) | (0.000) |
| × GC-RK          | 0.010 | 0.003 | 0.027 | 0.029 | 0.111 |
|                  | (0.848) | (0.956) | (0.607) | (0.360) | (0.733) |
| Risk aversion    | 0.018 | 0.018 | 0.019* | 0.017 | 0.017 |
|                  | (0.113) | (0.111) | (0.148) | (0.144) |
| Male             | -0.078 | -0.065 | -0.061 | -0.063 | -0.061 |
|                  | (0.101) | (0.172) | (0.195) | (0.197) | (0.211) |
| Age              | 0.010 | 0.008 | 0.006 | 0.011 | 0.010 |
|                  | (0.219) | (0.330) | (0.413) | (0.149) | (0.185) |
| Experience (Round) | -0.002 | -0.002 |
|                  | (0.606) | (0.607) |
| Previous win     | -0.022 | -0.021 |
|                  | (0.299) | (0.326) |
| Constant         | 0.248 | 0.287 | 0.313* | 0.221 | 0.242 |
|                  | (0.188) | (0.127) | (0.091) | (0.243) | (0.188) |
| Observations     | 252 | 252 | 252 | 2268 | 2268 |
| Obs per subject  | 1,2,3 | 1,2,3 | 1,2,3 | 9,18,27 | 9,18,27 |
| Log-likelihood   | -54.919 | -53.132 | -50.575 | -1393.340 | -1389.516 |
| Wald statistic   | 28.244*** | 32.242*** | 38.074*** | 67.704*** | 75.753*** |
|                  | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Test statistic on $\beta_{GC-RK} > \beta_{RK}$ | 4.111** | 4.847** | 2.967* | 16.39*** | 11.139*** |
|                  | (0.043) | (0.028) | (0.085) | (0.000) | (0.001) |

* p < 0.1, ** p < 0.05, *** p < 0.01. p-values in parentheses.

Note: Mixed effects linear regression models are estimated. Standard errors are clustered at the session and individual level. All models include a control dummy for the third gender, which is not reported in the table. Obs. per subject indicates the number of observations per participant, which vary because participants played different treatments across sessions.
### Table 4. Regression results: PSM subscales.

| Dependent Variable: | Decision to volunteer in each round |
|---------------------|--------------------------------------|
|                     | (6) | (7) | (8) | (9) |
| PSM subscales (centered): | COM | SS | APS | CPV |
|                      | 0.082** | 0.048* | 0.088*** | 0.054 |
|                      | (0.014) | (0.061) | (0.008) | (0.195) |
| × GC-CT             | -0.022 | -0.040 | -0.055 | -0.109** |
|                      | (0.571) | (0.203) | (0.211) | (0.047) |
| × RK                | 0.002 | -0.089*** | -0.045 | -0.003 |
|                      | (0.954) | (0.002) | (0.199) | (0.940) |
| × GC-RK             | -0.073* | -0.034 | -0.108*** | -0.042 |
|                      | (0.057) | (0.277) | (0.013) | (0.446) |
| Treatment (CT as the baseline) | | | | |
| GC-CT               | 0.157*** | 0.150*** | 0.150*** | 0.140*** |
|                      | (0.000) | (0.000) | (0.000) | (0.000) |
| RK                  | -0.133*** | -0.122*** | -0.128*** | -0.133*** |
|                      | (0.000) | (0.000) | (0.000) | (0.000) |
| GC-RK               | 0.026 | 0.020 | 0.008 | 0.021 |
|                      | (0.403) | (0.530) | (0.818) | (0.518) |
| Constant            | 0.159 | 0.215 | 0.234 | 0.208 |
|                      | (0.393) | (0.265) | (0.214) | (0.280) |
| Observations        | 2268 | 2268 | 2268 | 2268 |
| Obs per subject     | 9,18,27 | 9,18,27 | 9,18,27 | 9,18,27 |
| Log-likelihood      | -1391.077 | -1389.302 | -1389.637 | -1392.879 |
| Wald statistic      | 72.574 | 75.754 | 75.483 | 68.455 |

Observations * p < 0.1, ** p < 0.05, *** p < 0.01. p-values in parentheses. Controls are not reported in this table.
**Table 5.** Average marginal effects of PSM and its subscales on volunteering

| Treatment       | Model: | Average marginal effects (dy/dx across treatments) |
|-----------------|--------|-----------------------------------------------------|
|                 | (5) PSM | (6) COM | (7) SS | (8) APS | (9) CPV |
| CT              | 0.119*** | 0.082** | 0.048* | 0.088*** | 0.054 |
|                 | (0.005) | (0.014) | (0.061) | (0.008) | (0.195) |
| GC-CT           | 0.027   | 0.061   | 0.008  | 0.034   | -0.054 |
|                 | (0.672) | (0.177) | (0.829) | (0.494) | (0.385) |
| RK              | 0.039   | 0.085*  | -0.041 | 0.043   | 0.051 |
|                 | (0.481) | (0.070) | (0.232) | (0.311) | (0.314) |
| GC-RK           | -0.000  | 0.010   | 0.014  | -0.019  | 0.013 |
|                 | (0.995) | (0.828) | (0.705) | (0.697) | (0.840) |

* N=2,268. * p < 0.1, ** p < 0.05, *** p < 0.01. p-values in parentheses. Linear prediction of Model 5 to 9.
Figure 1. Game tree in the GC treatment
Figure 2. Linear prediction of Model 5 with 95% confidence intervals.