Empirical investigation of the problem of free riding in the context of public goods: the case of northeastern Turkey

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Abstract

Purpose – This study investigates the factors influencing free riding behavior, as well as cooperation and voluntary contribution decisions, in the context of public goods. This study aims to contribute to sustainable resource management debates by offering empirical insights into fostering voluntary cooperation and emphasizing the importance of individual and collective action in overcoming public goods challenges.

Design/methodology/approach – This study examines the free rider problem in the context of public goods, using the blood donation system in northeastern Turkey as a case study. The analysis consists of two phases. Binary logistic models were used to examine the probability of individuals being free riders and multinomial logistic regression models were used to explain the reasons for being free riders.

Findings – The findings reveal that free rider behavior is influenced by factors such as income level, gender, community trust and participation in collective action. Individuals with higher incomes and women are more likely to engage in free-rider behavior. Community trust emerged as a key determinant, with higher levels of trust reducing the likelihood of free riding. Additionally, factors such as incentives or coercion, participation in collective action, willingness to donate organs posthumously, confidence in obtaining blood if needed and prior blood donation experience help explain free rider behavior.

Originality/value – This study addresses a significant gap in the literature by integrating socioeconomic and demographic, psychological and behavioral factors to analyze free riding behavior, whereas traditional models often offer a one-dimensional perspective.

Keywords Public goods, Free rider problem, Blood donation, Voluntary contribution, Cooperation, Turkey

Paper type Research paper

1. Introduction

In many areas of social life, individuals benefit from goods and services without making any personal contribution. These types of goods are defined as public goods, and due to their non-excludable and non-rivalrous nature, they pose significant challenges for market mechanisms. One of the key issues arising from these characteristics is the free rider problem, in which individuals benefit without contributing. Free riding behavior is a natural consequence of the rational actor model in traditional economic theory, which assumes that individuals seek to maximize their self-interest (Reeson, 2008). As Olson (1965) also emphasized, when it is possible to benefit without paying, rational individuals are expected to refrain from contributing. This individual utility-maximizing tendency becomes particularly problematic when public goods require collective cooperation. Building on this premise, the free rider problem is fundamentally a collective action problem (Hardin and Cullity, 2020). Each rational individual sharing a common good seeks to maximize their own utility, even at the expense of societal well-being. Hardin (1968) identifies a tragedy in this dynamic, which he terms the "tragedy of the commons." This tragedy arises in systems where unrestricted individual action leads to the treatment of scarce resources as open-access property. In her work on the governance of common-pool resources and institutional diversity, Elinor Ostrom explains that rational individuals pursuing their self-interest may exploit limited resources without restraint, resulting in devastating overuse and destruction. However, this destruction can be prevented by individuals developing mechanisms that limit the use of common resources and protect them – particularly in contexts where individuals are able to communicate and establish shared expectations (Ostrom, 2008). While it is possible to benefit from such goods without contributing, sustained cooperation typically depends on shared norms of reciprocity and mutual trust. In line with Ostrom's approach to collective action, trust can be seen as a fundamental mechanism for overcoming the social dilemmas inherent in the provision of public goods (Ostrom, 2010).

In line with this debate, the current study examines a specific type of public good – voluntary blood donation – through the lens of the free rider problem, aiming to contribute to the

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literature by offering an empirically grounded case. Accordingly, the main objective of the study is to identify the factors affecting free riding behavior in the context of public goods – widely regarded in mainstream economics as a form of market failure – and to provide insights into the relative impact of these factors. To this end, the blood donation system is used as an illustrative example of a public good, as it relies on voluntary individual contributions for its sustainability (Culyer, 1973; Von Schubert, 1994; Wildman and Hollingsworth, 2009; Abásolo and Tsuchiya, 2014). Individuals who are medically eligible to donate blood regularly but choose not to contribute, while still benefiting from the collective blood supply when needed, are characterized as free riders (Abásolo and Tsuchiya, 2014). Blood donors are typically classified into three categories based on donation frequency: The first group consists of individuals who perceive donating as difficult or costly and, therefore, do not donate again. The second group includes those who donate sporadically and without consistency. The third group comprises regular donors, who are the most valuable to blood centers due to their sustained contributions (Wildman and Hollingsworth, 2009). This study specifically focuses on the third group – regular donors. While previous research has examined donor satisfaction and experiences throughout the donation process – emphasizing that enhancing the donor experience may improve loyalty and increase the likelihood of repeat donations (Njianga Mbeyap *et al.*, 2024) – the likelihood of donation and, in particular, the underlying reasons for non-donation, such as free riding behavior, have received considerably less empirical attention. By addressing this gap, the present study aims to provide a more comprehensive understanding of what drives individuals to consistently contribute – or refrain from contributing – to a vital public good such as the blood supply.

Conceptually grounded in the literature on public goods and collective action, this study builds on previous research showing that factors such as group size, social trust and civic engagement are associated with voluntary contribution behaviors. Drawing on these established theoretical insights, it examines how such mechanisms operate in the specific public good context of blood donation and explores the extent to which classical collective action theories correspond to individual-level tendencies and decisions. Despite an extensive global literature on collective action, context-specific empirical investigations remain scarce, particularly in countries like Turkey where institutional and cultural factors may shape free riding dynamics differently. Although a few studies have examined aspects of the free rider problem in Turkey, they have been limited in scope – often theoretical or descriptive – and lack the kind of multidimensional empirical analysis necessary for a comprehensive understanding of this phenomenon. Moreover, existing empirical research in other settings has generally focused on single-factor explanations (e.g. purely economic or demographic) rather than adopting a more holistic approach.

Addressing these gaps, the present study offers a broader contribution by integrating socioeconomic, psychological and behavioral variables within a unified analytical framework to investigate free riding in blood donation. In light of the above discussion, this study is guided by the following research questions (RQs):

RQ1. What are the main socioeconomic, psychological and behavioral factors influencing individuals' likelihood of exhibiting free riding behavior in the context of public goods?

RQ2. How do the underlying motivations for free riding behavior vary across different subgroups, and what role do demographic, trust-based and prior experience variables play in shaping these motivations?

To address these RQs, the study uses a two-stage modeling strategy: first a binary logistic regression to predict free riding behavior, and then a multinomial logistic regression to explore the underlying motivations for that behavior. To our knowledge, no prior study in Turkey has applied such an integrated, data-driven method in the context of a public good like blood donation. By bridging established collective action theories with new empirical evidence from northeastern Turkey, this integrated approach fills a significant geographical and empirical gap in the public goods literature. In doing so, the study makes a unique theoretical contribution by demonstrating how multiple explanatory factors jointly shape voluntary contribution behavior in a previously underexamined context – while also highlighting the role of prosocial cooperation as a critical yet often underexplored dimension in sustaining collective action over time.

The remainder of the paper is structured as follows: The introduction is followed by a literature review that outlines the conceptual and empirical background of the free-rider problem. Next, the data, variables and methodology are described, followed by the presentation of descriptive statistics and the results of binary and multinomial logistic regression analyses. The subsequent section discusses the findings in depth, and the final section offers theoretical and practical implications alongside the conclusion.

2. Literature review

2.1 Public goods and the free rider problem

The concept of public goods and the challenges posed by free riding have been widely discussed in economic theory. A free rider is defined as an individual who benefits from a good without paying for it or contributing to its provision (Leuthold, 1993; Bimber *et al.*, 2005; Mankiw, 2014; Hardin and Cullity, 2020). Free riders either consume more than their fair share or contribute less than their proportional cost of the good (Acemoğlu *et al.*, 2016). The lure of free access to things without paying for them and the fact that it does not express people's preferences causes wrong signals to be sent to suppliers, distortions in the supply and demand balance, inadequate supply of public goods and misallocation of resources. Such problems lead to the failure of the market to provide public goods as successfully as it does in providing private goods (Kaul *et al.*, 1999).

Free-riding behavior can be categorized into weak and strong forms based on the level of contribution to public goods (Brubaker, 1975). In the weak form, individuals contribute less than the Pareto optimal amount but still provide more than zero. In the strong form, individuals make no contribution at all to the provision of the public good (Lipford, 1995).

2.2 Determinants of voluntary contribution behavior

The problem of free rider and cooperation has been analyzed in the literature from various perspectives, especially in terms of group size, conditional cooperation based on rewards and punishments, altruism, trust, socioeconomic and demographic characteristics. According to Albanese and van Fleet (1985), the free rider problem is a theory that includes both group formation and individual decisions within the group. Group formation involves members coming together to achieve a shared goal, but the success and sustainability of the group depend on cooperation and equitable participation. Individuals who do not fulfill their duties and responsibilities in group work but share in the success of the group cause deviations from the set goals (Türksoy and Tütüncü, 2020), and while members can benefit from all the advantages that other members of the group benefit from, they contribute at the lowest possible level, leading to the problem of freeloader in groups (Kim and Walker, 1984). When making decisions within a group, individuals weigh the expected benefits of free riding against those of acting in the group's interest. Olson's (1965) group size hypothesis suggests that the tendency to free-ride increases with group size. In smaller groups, individuals are more confident that their contributions are impactful and that they will receive a significant share of the collective benefit. In larger groups, individuals perceive their contributions as insignificant to the collective outcome. Consequently, in large groups, individuals are likely to contribute only if external incentives or coercion compel them to act in the group's interest (Olson, 1965). As the size of the group increases, the tendency of everyone to be free riders increases and the possibility of the relevant public good not being produced at all arises (Browning and Zupan, 2015). Misumi (1989) identifies the breakdown of communication among group members as a key factor driving rational free-riding behavior. When communication is possible, individuals can exchange information about others' attitudes, make verbal agreements and build trust. These interactions foster cooperation and reduce the inclination to free ride, strengthening the group's collective effort.

There is a large body of literature suggests that incentives, such as rewards or sanctions like punishments, can effectively encourage individuals to contribute to organizations or common goods. These studies argue that individuals are likely to cooperate or increase their contributions to a public good when such conditions are in place (Clark and Wilson, 1961; Albanese and van Fleet, 1985; Kilbane and Beck, 1990). Accordingly, individuals motivated by external incentives or coercion are expected to sustain their contributions to public goods through mechanisms like monetary rewards or punishments, including social disapproval or criticism (Chaudhuri, 2011). However, a review of the literature also reveals counterarguments suggesting that rewards and punishments can negatively impact individuals' cooperation or contributions to public goods. According to this view, some individuals who voluntarily contribute to the public good are negatively affected by extrinsic incentives such as rewards or punishments, and the behavior of contributing to the public good is abandoned with the disappearance of intrinsic motivations such as pleasure, satisfaction, achievement and responsibility (Frey and Oberholzer-Gee, 1997; Gneezy and Rustichini, 2000a; Gneezy and Rustichini, 2000b; Frey and Jegen, 2001; Reeson, 2008; Evren and Minardi, 2017; Titmuss, 2018). This phenomenon, where extrinsic motivations undermine intrinsic or image-related motivations, is known as "motivation crowding out" (Evren and Minardi, 2017) or the "crowding-out of voluntary behavior" (Ertör Akyazı, 2018).

According to Olson (1965), a pioneer in the study of collective action and free riding, individuals tend to prioritize their own interests over those of society when conflicts arise between the two. In the absence of external incentives, they seek to maximize their utility by acting in their self-interest, often benefiting "for free" from the contributions of other group members. However, the fact that there is a voluntary group of individuals who voluntarily contribute to the provision of public goods and act out of feelings of altruism or altruism in doing so leads to the argument that the judgment that everyone will act as free riders in the presence of public goods may be wrong. Andreoni (1989) critiques traditional models that explain behaviors like donating or contributing to public goods, which often assume "pure altruism." In these models, contributions are driven solely by altruistic motivations. Andreoni argues that such altruism is not entirely pure. Andreoni (1989) conceptualizes impure altruism as "warm-glow giving" and presents a model analysis. In this model, individuals' altruism is impure, and those who donate or contribute receive a special benefit by gaining feel-good emotions in return for giving.

Research on the free rider problem and voluntary contributions to public goods, which represents a type of social dilemma, indicates that trust plays a significant role in fostering cooperative behavior (Lyne *et al.*, 2008; Qin *et al.*, 2011; Irwin and Berigan, 2013; Bohr, 2014). However, Misumi (2016) differentiates between interpersonal trust and community trust, emphasizing that community trust is the more critical factor in addressing free riding. Community trust aligns closely with moral trust, which serves as the foundation of organic solidarity and is linked to society's capacity to provide public goods. However, while trust in the community can work as a moral force constraining free riders, it can also facilitate free riding.

In the literature, it is understood that voluntary contribution behaviors and free riding are associated not only with individual motivations but also with sociodemographic factors. Willer *et al.* (2015) identified a consistent gender difference in charitable donations in the context of the USA; they found that women assumed a significantly larger share of contributions made for the public good compared to men. An experimental study conducted by Vicens *et al.* (2018) demonstrated a marked inequality in the distribution of contributions. Considering the study findings, individuals with lower levels of resources contributed significantly more to public goods than those with higher resource levels; in some cases, this difference reached up to twofold. In an empirical study conducted in Turkey, Çelik and Uğur (2024) found that male individuals displayed a higher tendency toward free riding compared to females. On the other hand, Lipi *et al.* (2024) framed free riding as the opposite of the norm of good citizenship; they reported that an increase in the level of education positively affected the tendency to be a good citizen, and that demographic variables such as age and gender also had statistically significant effects on this tendency.

2.3 Hypotheses development

In light of the existing literature, it is evident that free-riding behavior in public goods has been widely discussed, but often from a narrow or one-dimensional perspective. This study

contributes to this body of work by adopting a multidimensional framework and testing it in a context – voluntary blood donation – where public good dynamics are both tangible and underexplored, particularly in Turkey. By integrating socioeconomic-demographic, psychological and behavioral dimensions, the study aims to offer a more comprehensive understanding of the drivers behind voluntary (non-)contribution behavior.

Based on this literature, we formulate the following hypotheses:

H1. Free riding behavior is significantly associated with individuals' socioeconomic-demographic, psychological and behavioral characteristics.

H2. The stated motivations of free riders for not donating blood vary systematically across these individual-level factors.

3. Methods

This section outlines the multi-stage analytical process used in the study to ensure clarity and methodological transparency:

Step 1: Health eligibility screening

Participants were asked whether they had any health-related obstacles to blood donation. Those who answered "Yes" were excluded from the sample.

Step 2: Free riding behavior analysis

Remaining participants were asked whether they donate blood regularly. Responses were coded as "Yes" or "No". A binary logistic regression model was applied to explore the likelihood of regular donation (non-free riding behavior).

Step 3: Free rider subgroup analysis

Participants who do not donate regularly (potential free riders) were asked about their reasons. A multinomial logistic regression model was used to analyze four categories of non-donation motives.

A schematic overview of this framework is presented in Figure 1.

After presenting this overall framework, the following sections elaborate on the data source, sampling design, analysis method and variables used.

3.1 Data source

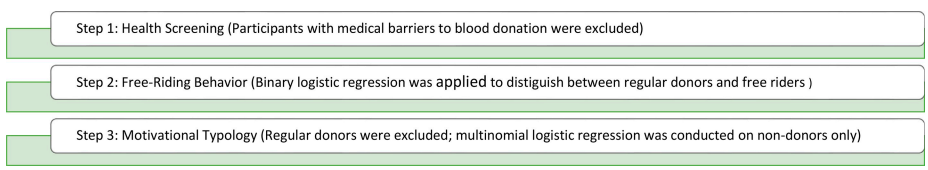
In this study, the blood donation system, which relies on voluntary and individual contributions for financing, was used as an example of a public good (Culyer, 1973; Von Schubert, 1994; Wildman and Hollingsworth, 2009; Abásolo and Tsuchiya, 2014). Individuals who are medically capable of donating blood, can benefit from blood stocks when needed, but still do not donate, were identified as free riders (Abásolo and Tsuchiya, 2014). The analysis of the study consists of two stages. In the first stage, a binary logistic regression model was used to examine the probability of individuals being free riders. At this stage, those with health barriers to regular donations were excluded from the analysis. In the second stage, a multinominal logistic regression model was used. At this stage, the subject consists of only free riders and the reasons for being a free rider are analyzed. For this reason, individuals with health barriers as well as individuals who donate regularly are excluded from the analysis in this model.

In the study, Erzurum province was selected as the regional representative of northeastern Turkey, and the study universe consists of individuals residing in the central districts of Erzurum (Yakutiye, Palandöken and Aziziye). Erzurum serves as a central province reflecting the geographic, demographic and cultural characteristics of northeastern Turkey, making it a suitable location for drawing broader conclusions about the region's economic and social dynamics. In addition to its demographic diversity, Erzurum also plays a central role in the regional health-care system, with patients from surrounding provinces often referred there for medical services (Çelik *et al.*, 2017). This functional centrality in public service provision further reinforces its relevance as a study site. Overall, it provides a robust sampling area by encompassing both urban and rural populations and representing diverse socioeconomic structures. The survey questions and variables were developed based on an extensive review of the literature, with Abásolo and Tsuchiya's (2014) study serving as a key reference.

3.2 Analysis method and variables

In this study, binary and multinomial logistic regression models were preferred because the dependent variables in both phases are categorical in nature (Çebi Karaaslan, 2021, 2022). Since the objective was to estimate the likelihood of individuals exhibiting free-riding behavior and to explore the reasons behind it, regression models designed for discrete outcomes were considered the most appropriate. Specifically, the multinomial logit (MNL) model was selected for the second stage because the dependent variable – motivational reasons for non-contribution – consists of nominal, non-ordered categories. There is no inherent ranking among these motivations; thus, models designed for ordered outcomes, such as ordinal logistic regression, were not suitable. Given this structure, the MNL model offers a flexible and statistically appropriate framework for analyzing such data. Logistic regression, in particular, was chosen for its interpretability and its ability to present results in the form of odds ratios, which facilitate a more intuitive understanding of the findings.

Figure 1 Overview of the three-stage methodological framework



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Alternative methods such as probit models were not preferred, as they often complicate interpretation without providing significant analytical advantages in this context. Structural equation modeling (SEM), on the other hand, was not considered applicable because the study does not involve latent constructs or multi-item scale development, which are typically among the primary conditions for using SEM (Farooq, 2016).

The independent variables used in this study are grouped into socioeconomic and demographic factors (gender, age, income, marital status, neighborhood), psychological factors (trust in the community, incentives and coercion) and behavioral factors (participation in collective actions, prior blood donation, decision to donate organs for posthumous use, trust in the blood supply). Community trust was included as a psychological factor and measured through a direct self-reported question asking respondents to indicate their level of trust in people in their community, on a scale ranging from 0 (no trust at all) to 10 (complete trust). The responses were treated as a continuous variable in the analysis. Other psychological and behavioral variables, such as perceptions of reward and punishment, voting behavior, participation in signature campaigns and confidence in accessing blood when needed, were also derived from single self-reported items and incorporated into the models as categorical or ordinal variables, depending on their structure. Given that the decision to donate blood is ultimately an individual choice, relying on one's own perception of social context, it is methodologically appropriate to assess such constructs through subjective evaluations. This approach offers a practical way to capture individual perceptions relevant to socially embedded behaviors such as voluntary blood donation. The factors affecting the likelihood of individuals being free riders were first analyzed using a binary logistic regression model, part of the discrete choice model family, and subsequently categorized based on the reasons for free riding, with multiple logistic regression analysis performed at this stage. After the data were organized with Excel program, SPSS program was used to calculate descriptive statistics. STATA 15 program was used for model estimation for binary and multiple logistic regression analyses.

The first model used in the study is the binary logistic regression model. This model examines the blood donation system, financed through voluntary and individual contributions, as an example of a public good. Individuals who have no health barriers to regular blood donation, can benefit from the blood stock when needed, but do not contribute to it, are classified as free riders. In the binary logistic regression model, socioeconomic and demographic factors such as neighborhood, gender, marital status, age and income were included as independent variables. With the inclusion of the neighborhood variable in the model, it was aimed to test Olson's (1965) hypothesis that the larger the group, the greater the free riding. In this context, the population size of the area of residence was taken as a proxy for group size (Abásolo and Tsuchiya, 2014). Yakutiye and Palandöken districts were considered as large groups and Aziziye district as small groups. For the income variable, the minimum wage at the time of the surveys was used to define the lowest income level. In addition to socioeconomic and demographic variables, the level of trust in the society in which the respondent lives is considered as a psychological factor, and participating in signature campaigns for the benefit of society and voting regularly in national and local elections, which are indicators of whether they contribute to the collective good, are considered as behavioral factors.

The second model used in the study is a multinomial logistic regression model. In this model, individuals who are unable to donate blood due to health-related issues, as well as regular donors, were excluded from the analysis. The focus was shifted to potential voluntary donors, and the dependent variable was defined as the reasons for not donating blood. The dependent variable was categorized as shown in Table 1.

The first category, as defined by Abásolo and Tsuchiya (2014), represents self admitted free riders, individuals who acknowledge benefiting from the collective blood supply without contributing. These individuals refrain from donating, reasoning that others already contribute sufficiently, allowing them to benefit from the public good without participating. The second category includes individuals motivated by "reciprocation logic," who choose not to donate because others also abstain. They express their decision as a form of retaliation or reciprocal behavior. The third category consists of individuals deterred by personal fears, such as fear of needles, pain or seeing blood. The fourth category captures individuals who cite reasons beyond the first three alternatives for not donating blood. The independent variables used in the binary logistic regression model were also included in this model. However, given the model's focus on free riders, additional variables related to the donation decision were introduced. These included psychological factors, such as the belief that providing rewards or punishments would encourage regular blood donation, and behavioral factors, such as confidence in obtaining blood when needed despite not donating, prior experience with blood donation and posthumous organ donation.

4. Findings

4.1 Binary logistic regression model: predicting the likelihood of free riding

For the binary logistic regression model, surveys were conducted with a total of 600 individuals. Surveys that were incomplete or incorrectly filled out were excluded from the analysis, leaving 570 valid responses. Participants were then asked whether they had any health issues that prevented them from donating blood. Since the inability to donate due to health reasons is beyond an individual's personal choice, those with such conditions were excluded from the analysis. The final analysis was carried out with 471 participants, and Table 1 presents the descriptive statistics, including frequencies and percentages, for individuals without any health-related barriers to blood donation, as included in the binary logistic regression model.

The binary logistic regression model, for which the descriptive statistics are presented in Table 2, is statistically

Table 1 Dependent variable categories in the multinomial logit model

Category code	Response category
(1)	*There are many people who already donate*
(2)	*Most people do not donate*
(3)	*I am afraid of needles/giving blood*
(4)	*Other*

Source(s): Authors' own work

Table 2 Descriptive statistics for individuals with no health barriers to donating blood

Variables	Frequency	%
Dependent variable (regular blood donation)		
Yes	46	9.77
No	425	90.23
Independent variables		
District		
Yakutiye	204	43.31
Palandöken	193	40.98
Aziziye	74	15.71
Gender		
Woman	223	47.35
Male	248	52.65
Marital status		
Married	151	32.06
Single	320	67.94
Age		
18–27	244	51.80
28–37	98	20.81
38–47	79	16.77
48–57	36	7.64
58–65	14	2.97
Income		
1. Income level (lowest)	227	48.20
2. Income level	126	26.75
3. Income level	70	14.86
4. Income level	31	6.58
5. Income level (highest)	17	3.61
Average community trust level: 3.364 (Min: 0 – Max: 10)		
Participation in signature campaigns		
Yes	176	37.37
No	295	62.63
Voting		
Yes	364	77.28
No	107	22.72

Source(s): Authors' own work

significant at $p < 0.0001$. To detect multicollinearity, the variance inflation factor (VIF) test, based on the inverse diagonal elements of the variance-covariance matrix (Arı and Yıldız, 2016), was applied. Since the VIF values for all variables in the model were below 5, it was determined that there is no multicollinearity issue among the independent variables. As a robustness check, a probit model was estimated using the same set of independent variables. The direction and statistical significance of the coefficients were consistent with those in the logit model. Overall, the statistical significance of the models, their internal consistency across both phases of analysis and their alignment with theoretical expectations provide a solid foundation for interpreting the findings. These characteristics also reduced the need for additional robustness tests within the scope of this study. The results of the binary logistic regression model are presented in Table 3.

An examination of Table 2 reveals that the variables neighborhood, gender, income, participation in signature campaigns, voting and trust in the community were found to be statistically significant. Table 3 presents the odds ratios (OR) for the factors affecting the likelihood of being a free rider. The OR is defined as the ratio of the probability of an event occurring to the probability of it not occurring. Specifically, the odds of an event refer to the ratio of the likelihood of its occurrence to the likelihood of its non-occurrence (Akgül, 2021). OR allow for the interpretation of logit coefficients directly. The estimated OR from the binary logistic regression model are provided in Table 4.

Considering the data presented in Tables 3 and 4, individuals residing in the Palandöken district are 4.08 times more likely to be free riders compared to the reference group. Men are 0.47 times less likely to be free riders than women. Individuals in the second income level are 3.43 times more likely to be free riders compared to the reference group. Those who do not participate in signature campaigns are 2.20 times more likely to be free riders than those who participate. Individuals who do not vote regularly are 0.38 times less likely to be free riders than those who vote regularly. Additionally, an increase in trust in the community reduces the likelihood of being a free rider by a factor of 0.86.

4.2 Multinomial logistic regression model: exploring stated reasons for free riding

The second model used in this study is a multiple logistic regression model. In this model, individuals with health conditions that prevent them from donating blood and those who regularly donate blood were excluded from the analysis, leaving 419 individuals (free riders) for further analysis. As described in Section 3.2, the dependent variable categories were defined as follows:

- "There are already many people who donate";
- "Most people do not donate";
- "I am afraid of needles/giving blood"; and
- "Other."

The independence of irrelevant alternatives (IIA), a critical assumption of the multiple logistic regression method, was tested through various methods. In this study, the Small-Hsiao test, one of the most frequently used tests in the literature for assessing IIA, was applied. The results of the Small-Hsiao test are presented in Table 5:

H0. The odds are independent of other alternatives.

H1. The odds are not independent of other alternatives.

According to the Small–Hsiao test, the null hypothesis asserts that the odds are independent of other alternatives. As shown in Table 4, for the categories "There are already many people who donate," "Most people do not donate," "I am afraid of needles/giving blood" and "Other," the significance levels are greater than 5%. Therefore, the null hypothesis (*H0*) cannot be rejected. Considering this result, it was deemed appropriate to perform a multiple logistic regression analysis.

Descriptive statistics, including the frequencies and percentages of individuals without any health problems preventing them from donating blood but who do not donate regularly (free riders), are presented in Table 6.

Table 3 Estimation results of binary logistic regression model

Variables	β	Std. error
District (reference: Aziziye)		
Yakutiye	0.528	0.480
Palandöken	1.407**	0.608
Gender (reference: Female)		
Male	−0.748**	0.358
Marital status (reference: Married)		
Single	−0.304	0.484
Age (reference: 18–27)		
28–37	−0.347	0.496
38–47	−0.747	0.577
48–57	0.352	0.862
58–65	−1.187	0.852
Income (reference: 1. Income level (lowest))		
2. Income level	1.233*	0.477
3. Income level	0.502	0.483
4. Income level	1.305	0.819
5. Income level (highest)	1.400	1.094
Those who did not participate in the signature campaign	0.790**	0.343
Voting (reference: Regular voters)		
Non-regular voters	−0.965**	0.411
Community trust level	−0.146**	0.065
Fixed term	2.891	0.759

Note(s): *, ** and ***indicate that the coefficient is significant at 1, 5 and 10% significance levels, respectively
Source(s): Authors' own work

Table 4 Binary logistic regression model odds ratio estimation results

Variables	OR	Std. error
District (reference: Aziziye)		
Yakutiye	0.590	0.283
Palandöken	4.084**	2.483
Gender (reference: Female)		
Male	0.473**	0.170
Marital status (reference: Married)		
Single	0.738	0.357
Age (reference: 18–27)		
28–37	0.707	0.351
38–47	0.474	0.274
48–57	1.421	1.225
58–65	0.305	0.260
Income (reference: 1. Income level (lowest))		
2. Income level	3.433*	1.636
3. Income level	1.653	0.798
4. Income level	3.688	3.020
5. Income level (highest)	4.056	4.438
Those who did not participate in the signature campaign	2.204**	0.756
Voting (reference: Regular voters)		
Non-regular voters	0.381**	0.157
Community trust level	0.864**	0.056
Fixed term	18.018	13.676

Note(s): *, ** and ***indicate that the coefficient is significant at 1, 5 and 10% significance levels, respectively
Source(s): Authors' own work

Table 5 Small–Hsiao test

Dependent variable	lnL (full)	lnL (omit)	Chi^2	Freedom degree	$p > Chi^2$
There are already many people who donate	−142.460	−115.005	54.910	60	0.662
Most people do not donate	−170.009	−142.835	54.349	60	0.681
I am afraid of needles/giving blood	−168.941	−142.498	52.886	60	0.731
Other	−149.902	−129.242	41.322	60	0.969

Source(s): Authors' own work

The multiple logistic regression model, for which descriptive statistics are presented in Table 6, is statistically significant at $p < 0.0001$. The variance inflation factors (VIF) test was used to assess multicollinearity, and since the VIF for the variables in the model were all below 5, no multicollinearity problems were detected for any of the independent variables. The results of the estimated multiple logistic regression model are presented in Table 7. The dependent variable groups are defined as follows: Group 1: "There are already many people who donate," Group 2: "Most people do not donate" and Group 3: "I am afraid of needles/giving blood."

The multinomial logistic regression model was found to be statistically significant ($p < 0.0001$). Based on the results, for the category "There are already many people who donate," the variables neighborhood, age, income, trust, the belief that offering rewards increases regular blood donation and the belief that imposing penalties increases regular blood donation were identified as statistically significant. For the category "Most people do not donate," the variables neighborhood, age, income, participation in signature campaigns, organ donation, confidence in obtaining blood when needed even without donating, the belief that offering rewards increases regular blood donation and the belief that imposing penalties increases regular blood donation were found to be statistically significant. For the category "I am afraid of needles/giving blood," the variables gender, marital status, age, voting behavior, having donated blood at least once, confidence in obtaining blood when needed even without donating and the belief that offering rewards increases regular blood donation were determined to be statistically significant.

In the binary logistic regression model, OR are used as relative risk measures to interpret coefficients, whereas in the multinomial logistic regression model, the relative risk ratio (RRR) is used. The RRR is the exponential of the estimated coefficients in multinomial logistic regression and represents the likelihood of being in a specific category relative to a baseline category. The RRR expresses the probability of remaining at the relevant level compared to the baseline (Avcılar and Yakut, 2015). RRR expresses the rate of occurrence of an event for decision-makers with a risk factor compared to decision-makers without a risk factor (Alpar, 2011). Especially in models with categorical independent variables, RRR values present the direction and magnitude of the relationship in a more intuitive and interpretable way (Norton and Dowd, 2018). Applied studies in social sciences frequently prefer the use of RRR (Long and Freese, 2014). Table 8 shows the RRR of the multiple logistic regression model.

According to the results of the multinomial logistic regression model presented in Table 8, for the category "There are already many people who donate," individuals residing in the Palandöken district are 0.33 times less likely to be free riders compared to the reference group. Individuals aged 28–37 are 2.89 times more likely to be free riders, those aged 38–47 are 3.33 times more likely, individuals aged 48–57 are 8.10 times more likely and those aged 58–65 are 7.26 times more likely to be free riders compared to the reference group. Individuals in the second income level are 0.49 times less likely to be free riders, while those in the fifth income level are 6.15 times more likely. An increase in trust in the community reduces the likelihood of being a free rider by 0.89 times. Individuals who believe that offering rewards will increase regular blood donation are 2.77 times more likely to be free riders, and those who strongly believe that imposing penalties will increase regular blood donation are 2.76 times more likely to be free riders compared to the reference group.

For the category "Most people do not donate," individuals residing in the Palandöken district are 0.23 times less likely to be free riders compared to the reference group. Individuals aged 38–47 are 4.01 times more likely, and those aged 48–57 are 7.08 times more likely to be free riders compared to the reference group. Individuals in the third income level are 3.34 times more likely to be free riders. Individuals who participate in signature campaigns are 0.54 times less likely to be free riders than those who do not participate. Individuals who do not agree with the belief that they can obtain blood in case of need without donating are 0.23 times less likely to be free riders compared to the reference group. Individuals who believe that offering rewards will increase regular blood donation are 3.66 times more likely to be free riders, and those who strongly believe that imposing penalties will increase regular blood donation are 4.38 times more likely to be free riders. Furthermore, individuals who donate organs are 4.31 times more likely to be free riders than those who do not donate organs.

For the category "I am afraid of needles/giving blood," men are 0.57 times less likely to be free riders due to fear of needles or blood donation compared to women. Single individuals are 0.43 times less likely to be free riders for this reason compared to married individuals. Individuals aged 28–37 are 0.31 times less likely to be free riders compared to the reference group. Those who vote regularly are 2.80 times more likely to be free riders for this reason compared to those who do not vote regularly. Individuals who have donated at least once are 1.79 times more likely to be free riders than those who have never donated. Those who do not agree with the belief that they can obtain blood in case of need without donating are 2.82 times more likely to be free riders. Finally, individuals who do not believe that offering rewards will increase regular blood donation are 0.29 times less likely to be free riders for this reason compared to the reference group.

5. Discussion

This paper examines the problem of free riding inherent in public goods, characterized by non-competitiveness and non-

Table 6 Descriptive statistics for free riders

Variables	Frequency	%
Dependent variable (reasons for not donating blood regularly/reasons free riders do not donate)		
There are already many people who donate	116	27.68
Most people do not donate	86	20.53
I am afraid of needles/giving blood	89	21.24
Other	128	30.55
Independent variables		
District		
Yakutiye	174	41.53
Palandöken	185	44.15
Aziziye	60	14.32
Gender		
Woman	198	47.26
Male	221	52.74
Marital status		
Married	133	31.74
Single	286	68.26
Age		
18–27	218	52.03
28–37	91	21.72
38–47	64	15.27
48–57	35	8.35
58–65	11	2.63
Income		
1. Income level (Lowest)	199	47.49
2. Income level	116	27.68
3. Income level	60	14.32
4. Income level	28	6.68
5. Income level (Highest)	16	3.82
Average community trust level: 3.561 (Min: 0 – Max: 10)		
Signature campaigns		
Yes	148	35.32
No	271	64.68
Voting		
Yes	327	78.04
No	92	21.96
Donating at least once		
Yes	211	50.36
No	208	49.64
Confidence in obtaining blood in case of need without donating		
Strongly disagree	28	6.68
Disagree	44	10.50
Neutral	91	21.72
Agree	159	37.95
Strongly agree	97	23.15
The belief that providing rewards will increase regular blood donations		
Strongly disagree	66	15.75
Disagree	61	14.56
Neutral	63	15.04
Agree	126	30.07
Strongly agree	103	24.58
The belief that imposing penalties will increase regular blood donations		
Strongly disagree	152	36.28
Disagree	89	21.24
Neutral	54	12.89
Agree	65	15.51
Strongly agree	59	14.08
Organ donation		
Yes	22	5.25
No	397	94.75

Source(s): Authors' own work

Table 7 Estimation results of the multinomial logistic regression model

Variables	β (1. Group)	Std. error (1. Group)	β (2. Group)	Std. error (2. Group)	β (3. Group)	Std. error (3. Group)
District (Reference: Aziziye)						
Yakutiye	0.275	0.476	−0.270	0.490	0.233	0.549
Palandöken	−1.0986**	0.498	−1.462*	0.522	0.295	0.547
Gender (Reference: Female)						
Male	−0.319	0.310	0.116	0.344	−0.571***	0.327
Marital status (Reference: Married)						
Single	0.198	0.437	0.216	0.474	−0.851***	0.512
Age (Reference: 18–27)						
28–37	1.061**	0.427	0.189	0.493	−1.189**	0.515
38–47	1.204**	0.540	1.389**	0.563	−0.413	0.611
48–57	2.092*	0.716	1.957*	0.760	−0.467	0.880
58–65	1.983***	1.029	1.125	1.073	−13.422	500.046
Income (Reference: 1. Income level (Lowest))						
2. Income level	−0.711***	0.388	0.120	0.425	0.403	0.394
3. Income level	−0.332	0.539	1.293**	0.533	0.607	0.555
4. Income level	−0.602	0.658	−0.224	0.693	−0.166	0.751
5. Income level (Highest)	1.817**	0.902	1.470	1.063	1.022	1.093
Signature campaigns (Reference: Non-participants)						
Signature campaigns participants	−0.375	0.322	−0.617***	0.356	−0.228	0.334
Voting (Reference: Regular non-voters)						
Regular voters	−0.185	0.355	0.104	0.409	1.029**	0.408
Community trust level	−0.117**	0.056	−0.509	0.063	−0.009	0.058
Having donated at least once (Reference: Those who have donated even once)						
Those who have never donated even once	0.096	0.304	0.476	0.334	0.583***	0.323
Confidence in obtaining blood in case of need without donating (Reference: Those who strongly agree)						
Strongly disagree	−0.924	0.684	−1.490***	0.828	−0.651	0.663
Disagree	−0.703	0.622	−0.125	0.622	1.035***	0.569
Neutral	0.020	0.459	−0.744	0.478	0.479	0.481
Agree	0.034	0.384	−0.588	0.419	−0.133	0.430
The belief that providing rewards will increase regular blood donations (Reference: Those who strongly disagree)						
Disagree	−0.211	0.546	−0.298	0.623	−1.251**	0.615
Neutral	0.068	0.562	0.205	0.635	−0.028	0.576
Agree	1.020**	0.491	1.299**	0.549	0.690	0.485
Strongly agree	−0.283	0.503	0.203	0.568	−0.509	0.511
The belief that imposing penalties will increase regular blood donations (Reference: Those who strongly disagree)						
Disagree	−0.513	0.429	0.577	0.456	−0.258	0.421
Neutral	0.059	0.490	0.523	0.541	−0.594	0.561
Agree	0.254	0.450	0.709	0.510	0.137	0.472
Strongly agree	1.014**	0.497	1.477*	0.543	0.700	0.508
Organ donation (Reference: Those who have not donated organs)						
Those who have donated organs	0.537	0.673	1.460**	0.668	−0.131	0.759
Fixed term	0.353	0.902	−1.187	1.030	0.574	0.567

Note(s): *, ** and ***indicate that the coefficient is significant at 1, 5 and 10% significance levels, respectively
Source(s): Authors' own work

excludability, which allows individuals to benefit without contributing to their provision. This dynamic often leads to underproduction and sub-optimal social provision of public goods. Using the blood donation system as a case study, the research examines the behavior of individuals who, despite having no health impediment to donate, do not contribute to blood stocks but could benefit from the common blood stock if needed, thus illustrating the complexities of free riding in the provision of public goods.

The analyses were conducted in two stages. In the first stage, the factors affecting the likelihood of individuals becoming free rider were analyzed using a binary logistic regression model,

Table 8 Estimated relative risk ratios (RRR) for the multinomial logistic regression model

Variables	RRR (1. Group)	Std. error (1. Group)	RRR (2. Group)	Std. error (2. Group)	RRR (3. Group)	Std. error (3. Group)
District (Reference: Aziziye)						
Yakutiye	1.316	0.626	0.763	0.374	1.262	0.692
Palandöken	0.333**	0.166	0.232*	0.121	1.343	0.735
Gender (Reference: Female)						
Male	0.727	0.225	1.123	0.386	0.565***	0.185
Marital Status (Reference: Married)						
Single	1.219	0.533	1.241	0.589	0.427***	0.219
Age (Reference: 18–27)						
28–37	2.888**	1.234	1.208	0.596	0.305**	0.157
38–47	3.334**	1.802	4.012**	2.260	0.662	0.404
48–57	8.100*	5.797	7.080*	5.379	0.627	0.552
58–65	7.262***	7.471	3.079	3.304	1.480	0.000
Income (Reference: 1. Income level (Lowest))						
2. Income level	0.491***	0.190	1.128	0.480	1.496	0.590
3. Income level	0.718	0.387	3.344**	1.942	1.836	1.019
4. Income level	0.548	0.360	0.978	0.677	0.847	0.636
5. Income level (Highest)	6.155**	5.551	4.351	4.624	2.780	3.038
Signature campaigns (Reference: Non-participants)						
Signature campaigns participants	0.687	0.221	0.539***	0.192	0.796	0.266
Voting (Reference: Regular non-voters)						
Regular Voters	0.831	0.295	1.110	0.454	2.799**	1.142
Community trust level	0.890 **	0.500	0.950	0.059	0.991	0.057
Having donated at least once (Reference: Those who have donated even once)						
Those who have never donated even once	1.100	0.334	1.609	0.538	1.791***	0.578
Confidence in obtaining blood in case of need without donating (Reference: Those who strongly agree)						
Strongly disagree	0.397	0.272	0.225 ***	0.187	0.522	0.346
Disagree	0.495	0.308	0.882	0.549	2.815***	1.602
Neutral	1.020	0.468	0.928	0.443	1.614	0.776
Agree	1.034	0.397	0.555	0.233	0.875	0.376
The belief that providing rewards will increase regular blood donations (Reference: Those who strongly disagree)						
Disagree	0.810	0.443	0.742	0.463	0.286**	0.176
Neutral	1.071	0.602	1.228	0.780	0.972	0.560
Agree	2.772**	1.361	3.664**	2.100	1.994	0.967
Strongly agree	0.754	0.379	1.226	0.697	0.601	0.307
The belief that imposing penalties will increase regular blood donations (Reference: Those who strongly disagree)						
Disagree	0.599	0.257	1.780	0.812	0.772	0.325
Neutral	1.061	0.520	1688	0.912	0.552	0.310
Agree	1.289	0.580	2.032	1.037	1.147	0.541
Strongly agree	2.758**	1.371	4.379*	2.379	2.014	1.022
Organ donation (Reference: Those who have not donated organs)						
Those who have donated organs	1.711	1.151	4.306**	2.874	0.877	0.665
Fixed Term	1.423	1.283	0.305	0.314	0.574	0.567

Note(s): *, ** and ***indicate that the coefficient is significant at 1, 5 and 10% significance levels, respectively
Source(s): Authors' own work

which belongs to the family of discrete choice models, and in this step, individuals with health problems that prevent them from donating blood were excluded from the analysis. In the second step, individuals with health problems who regularly donate blood were excluded, and instead we focused on individuals who do not donate regularly (free riders). These individuals were categorized according to their reasons for not donating. At this stage, multinomial logistic regression analysis, which is also part of the discrete choice model family, was performed. Both discrete choice models were statistically significant ($p < 0.0001$).

According to the results of the binary logistic regression analysis, individuals residing in the Palandöken district are more likely to be free riders compared to those residing in the

Aziziye district. When the population size of the area of residence is considered as group size, our findings support Olson's (1965) group size hypothesis. In smaller groups, communication and interaction among individuals are more prominent. In addition, individuals in smaller groups tend to have more positive perceptions about their contributions making a difference. Therefore, this finding is found to be consistent with our expectations. These results are consistent with the findings of Sweeney (1973), Kilbane and Beck (1990), Zaleski and Zech (1992), Zaleski and Zech (1996) and Mukhopadhaya (2003). In contrast to our findings, Lipford (1995) did not find support for the group size hypothesis, and Haan and Kooreman (2002) reported a weak relationship between group size and voluntary contributions. According to Rapoport *et al.* (1989), group size alone is insufficient to explain contributions to public goods.

The binary logistic regression analysis also shows that men are less likely to be free riders than women. This result is consistent with the findings of Abásolo and Tsuchiya (2014) and Wu (2020). However, in contrast to our findings, Eckel and Grossman (1998) found that women are more cooperative than men, while Lyne *et al.* (2008) reported that men are more likely to be free riders than women.

According to the results of the binary logistic regression analysis, individuals with higher income levels are more likely to be free riders compared to those with lower income levels. Many studies investigating the relationship between income and cooperation, charitable donations and voluntary contributions have found that lower-income individuals tend to contribute a higher percentage of their total income (even if not in absolute terms) compared to those in higher-income groups (Buckley and Croson, 2006; Caplanova and Sirakovova, 2022) or demonstrate greater cooperativeness (Roy Chowdhury, 2022). The greater cooperativeness and altruism of individuals in lower-income groups may be explained by their heightened empathy for those in need.

Participation in signature campaigns for the public good can be considered a contribution to collective action. Individuals who contribute to collective actions tend to feel a sense of social responsibility. For such individuals, solidarity and social bonds are important, and they strive for collective well-being. Our findings are consistent with these expectations, as individuals who do not participate in signature campaigns are more likely to be free riders compared to those who do.

Trust is one of the most important factors in ensuring social stability. The level of trust individuals have in the community they live in strengthens social bonds, facilitates positive interactions among individuals and fosters empathy. For these reasons, people who trust their community are expected to be more cooperative and altruistic. In line with this expectation, our analysis results indicate that an increase in trust in one's community reduces the likelihood of being a free rider. The literature examining social dilemmas in contributing to collective welfare has similarly suggested that individuals who trust their community or group are more cooperative and altruistic (Kahan, 2003; Lyne *et al.*, 2008; Qin *et al.*, 2011; Bohr, 2014). However, in contrast to our findings, Wu (2020) did not find a significant relationship between trust levels and cooperation, while Misumi (2016) argued that community trust can play a restrictive role in free riding but may also facilitate it under certain conditions.

In the second stage of the analysis, the reasons for individuals' free-riding behavior were examined using multinomial logistic regression, a model from the family of discrete choice models. In this stage, free riders were categorized based on their reasons for not donating. Individuals without any health problems preventing them from donating blood but who still did not donate were asked to choose one of four reasons:

1 "There are already many people who donate";
2 "Most people do not donate";
3 "I am afraid of needles/giving blood"; and
4 "Other."

Those who selected the first category correspond to what Abásolo and Tsuchiya (2014) described as self-admitted free riders, that is, individuals who acknowledge benefiting from the public good without contributing. These individuals choose not to contribute because they know they can benefit from public goods without paying for them. The second category was framed as a response driven by a sense of retaliation or reciprocity. When individuals perceive that others avoid contributing or that their own contributions are exploited, they may withdraw their cooperation out of feelings such as anger or pride, and in some cases, engage in personally costly retaliatory actions (Kahan, 2003). Individuals who chose not to donate because "most people do not donate" were evaluated as acting with retaliatory intent.

The results revealed that age is a significant factor in explaining individuals' reasons for free riding. Across all age groups, individuals were more likely than those in the youngest age group to free-ride with the justification that "there are already many people who donate." Similarly, individuals in the middle age range were more likely than the youngest age group to free-ride with the reasoning that "most people do not donate." These findings suggest that the youngest age group is less inclined to engage in free riding, whether by self-identifying as free riders or by acting out of retaliatory intent, compared to older age groups.

An increase in the level of trust in one's community reduces the likelihood of free riding based on the justification that "there are already many people who donate." This finding is consistent with the results of the first model, further supporting the relationship between trust in the community and free-riding behavior.

To determine the impact of incentives or coercion on free riding, participants were asked whether mechanisms such as rewards or penalties could increase blood donations, and the results were evaluated accordingly. Individuals who agreed with the statement that providing rewards would increase regular blood donations were more likely to free-ride due to the belief that "there are already many people who donate" or "most people do not donate," compared to those who disagreed. Similarly, individuals who strongly agreed that penalties would increase regular blood donations were also more likely to free-ride for the same reasons compared to those who did not agree. Thus, it can be argued that both self-identified free riders and those motivated by reciprocity are influenced by incentives. These findings suggest that external

motivations, such as rewards and penalties, can have a positive impact on voluntary contributions (Kilbane and Beck, 1990; Loehman *et al.*, 1996; Fehr and Gächter, 2000; Masclet *et al.*, 2003). However, it is important to note that external incentives or coercion may alienate donors who are driven by intrinsic motivations such as altruism and sacrifice, as argued by Titmuss (2018) and Mellström and Johannesson (2008) (the crowding-out of motivation or voluntary behavior). Therefore, policy designs aimed at encouraging voluntary contributions should carefully analyze and understand the target audience to avoid undermining voluntary participation.

Individuals who participate in signature campaigns are less likely to free-ride for the reason that "most people do not donate" compared to those who do not participate. Participation in signature campaigns, and thereby contributing to collective welfare, decreases the likelihood of free riding by fostering a sense of reciprocity.

National blood reserves are not constant and may occasionally fall below minimum levels. Regardless of how well the health-care system functions, maintaining adequate blood reserves relies on regular and continuous donations. Our results indicate that individuals who lack confidence in their ability to obtain blood in case of need without donating are less likely to free-ride due to the belief that "most people do not donate."

Voluntary contributions by individuals to the provision of public goods are zero in the strong version of free riding, while in the weak version, they are less than the optimal amount but greater than zero. This study does not explicitly distinguish between the strong and weak versions of free riding. However, when analyzing the responses of individuals who do not donate blood regularly, it is observed that more than half have donated blood at least once. This suggests that these individuals represent the weak version of free riding. Past experiences can also affect individuals' decisions to a certain extent. It is thought that prior donation experiences may impact the likelihood of individuals who have donated at least once to contribute again. Therefore, ensuring a positive first donation experience is important not only for the continuity of voluntary contributions but also for encouraging potential donors, given that individuals are likely to share this experience with their close social networks.

6. Implications and conclusion

6.1 Implications for theory and practice

This study contributes to the literature on public goods and collective action by empirically investigating how trust-based, behavioral and experiential variables influence cooperative behavior in the context of vital public goods that rely on voluntary contributions, such as blood donation. While previous studies have primarily focused on economic or demographic predictors of free-riding behavior (Eckel and Grossman, 1998; Buckley and Croson, 2006), this study integrates these dimensions with psychosocial and behavioral factors to offer a more comprehensive analytical framework. In contrast to the prevailing reliance on laboratory experiments or hypothetical scenarios (Loehman *et al.*, 1996; Fischbacher *et al.*, 2001; Mellström and Johannesson, 2008; Shang and Croson, 2009), the present study draws on real-world behavior within a naturally occurring public good system. By identifying distinct subtypes of non-donors and exploring their underlying motivations, it extends prior work (Abásolo and Tsuchiya, 2014) by examining conditional cooperation, reward–punishment dynamics and trust-related mechanisms together within a unified empirical structure. This approach enables a more nuanced understanding of free riding as a heterogeneous phenomenon and offers theoretical insights that contribute to the refinement of collective action theories.

From a practical standpoint, the findings can inform policies aimed at increasing voluntary contributions to public goods such as blood donation. The study suggests that building community trust, fostering the internalization of cooperation among citizens and encouraging voluntary participation can reduce the tendency toward free riding. Strategies that enhance intrinsic motivation may be particularly valuable for public authorities and NGOs seeking to improve the use of common resources, support the provision of public goods, increase charitable giving and strengthen collective action outcomes.

6.2 Conclusion

Consistent with the literature, this study argues that while the free rider problem specific to public goods cannot be entirely eradicated, it can be mitigated through targeted interventions. Particularly within the Turkish context, the limited number of empirical studies addressing this issue highlights the need for further research in fields such as microeconomics, public economics, social psychology and behavioral sciences. The existence of public goods and the market failures they generate pose significant challenges regarding the equitable distribution and efficient use of scarce resources, making these topics critical for both academic inquiry and policy development.

In this regard, it is essential for public authorities to design behaviorally informed policies that consider the multidimensional nature of human behavior and incorporate both intrinsic and extrinsic motivational drivers. While external drivers – such as incentives and sanctions – can play a supportive role, policies aimed at strengthening individuals' internal sense of civic responsibility and solidarity are equally crucial. Within this framework, promoting prosocial cooperation as a civic norm emerges as a vital strategy for encouraging and sustaining voluntary participation in the provision of public goods.

Educational programs and awareness initiatives introduced from an early age can help internalize cooperative behaviors by emphasizing the long-term value of individual contributions to collective welfare. In parallel, symbolic incentive mechanisms – such as digital appreciation certificates, public recognition or community-based reward systems – can enhance the perceived social value of participation, particularly among first-time or irregular contributors. The quality of the initial experience – such as in blood donation, a widely acknowledged example of voluntary participation in public goods – also plays a pivotal role in shaping perceptions and fostering future engagement. Thus, ensuring that such processes are safe, efficient and respectful is fundamental to cultivating long-term commitment. These principles can be extended to other domains where free riding is prevalent, offering valuable insights for encouraging sustained prosocial involvement across a range of public good settings.

From a practical perspective, improving access to participation – such as in the case of blood donation – is an

essential step toward addressing the under provision of public goods. Instead of concentrating donation services in easily accessible locations like urban centers or university campuses, deploying mobile units and offering flexible hours in underserved areas would support broader inclusion. While blood donation serves as a central example in this study, the underlying principles apply to many other public goods affected by free-rider dynamics. Equally important is challenging the common perception that individual efforts are insignificant. Many refrains from contributing because they feel their actions would not make a real difference. To change this mindset, it is important to clearly show how individual actions, even small ones, can contribute to larger societal outcomes. Sharing real examples and simple statistics that highlight the impact of such contributions can help people see the value of their involvement. This, in turn, may encourage more people to participate voluntarily in the provision of public goods. Furthermore, especially during times of crisis or when someone from an individual's close circle is in need, many people donate blood without hesitation, and barriers such as fear, time limitations or distance temporarily disappear. This shows that behavioral obstacles are not fixed but rather shaped by context and emotional conditions. However, such sudden and large-scale donations are not sufficient in terms of long-term sustainability. A vital public good like blood supply requires regular and voluntary contributions. Therefore, the main challenge is how to encourage individuals to contribute not only during emergencies but on an ongoing basis. At this point, it is essential for policymakers to carefully analyze how society reacts to different circumstances and develop behaviorally informed policy tools accordingly. The findings of our study can offer valuable guidance to policymakers by revealing the reasons why different groups of individuals refrain from contributing.

While free riding may appear rational at the individual level by maximizing personal utility, it ultimately undermines collective welfare and may, over time, diminish personal well-being as well. The COVID-19 pandemic – a public health emergency with far-reaching economic and social implications – served as a stark reminder of the critical importance of collective action and mutual responsibility. Policymakers should draw lessons from such crises and prioritize building trust within communities. Emphasizing the shared value of cooperation and fostering prosocial norms are essential to ensuring that individual rationality aligns with the broader interests of society.

Despite its contributions, this study has certain limitations. First, the analysis is based on self-reported data reflecting individuals' own evaluations. This reliance on self-report data may make the study susceptible to common method bias (CMB). Second, there may be other factors influencing free riding that were not addressed in this research. In addition, our findings may not be fully generalizable to the entirety of Turkey or to all regions of other countries. Future studies may consider these limitations and conduct more comprehensive research. Third, the way free riding is defined in this study mostly focuses on individual characteristics and reported reasons. However, there might also be broader contextual factors – such as time constraints, workload or accessibility issues – that influence people's ability to contribute but were not included in the analysis. Furthermore, the use of a single-item 0–10 scale to measure "community trust" is a practical choice but represents a simplified approach. This should be noted as a limitation, and future research may consider more detailed measures to capture the complexity of trust.

While the scope of this study is limited to blood donation, the mechanisms it explores – such as the role of trust, perceived incentives and behavioral motivations – may also shed light on cooperation dynamics in other public good settings. Without claiming generalizability, the findings offer a perspective that can inspire further inquiry into voluntary contribution behavior across different domains.

Ethics statement

Approval for the study was obtained from the Erzurum Technical University Scientific Research and Publication Ethics Committee on November 17, 2022, confirming that the research complied with ethical standards.

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