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Social preferences and well-being: theory and evidence

Masaki Iwasaki ¹ 

Many studies have shown that individuals engage in prosocial behaviors, such as pro-environmental and charitable behaviors, on the basis of their social preferences. But the nature of social preferences has not been well studied, and it has been unclear how they relate to individual well-being. It is important to clarify this linkage so that various policies and laws can maximize social welfare. This study explores the hypothesis that social preferences are in general positively correlated with subjective well-being and that individuals who are more prosocial are happier than individuals who are more proself. This study first presents a theoretical model that mathematically describes the relationship between social preferences and subjective well-being. Then it uses survey data from the United States to empirically examine the relationship between the two. Regression analysis finds a statistically significant positive correlation between prosociality and total well-being, a correlation driven primarily by eudaimonic well-being and hedonic well-being, subdomains of total well-being. The effect size of prosociality on well-being is similar to the effect sizes of parenthood, income, and education, which are important determinants of well-being, thus confirming that prosociality is a crucial determinant of individual well-being.

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Introduction

International agreements and national laws use rewards, sanctions, nudging, and other techniques of intervention to encourage individuals and businesses to take prosocial actions like recycling and saving electricity to protect the global environment.¹ These laws may intentionally or unintentionally alter individual preferences in addition to individual behavior (Matauch et al., 2022). When the law encourages prosocial preferences, a simple but essential question, the question investigated by this paper, arises: Are prosocial people happier than proself people?² If persons with prosocial preferences have lower levels of well-being than those with proself preferences, people will be unhappy to the extent that they are impelled or nudged to consider the interests of others as well as their own. This would mean that many laws may cause individuals to be unhappy. Despite its importance, the relationship between social preferences and well-being has not yet been examined scientifically.

Social preferences are the preferences of individuals regarding the payoffs or well-being of others (Charness and Rabin, 2002; Levitt and List, 2007), and individuals behave prosocially on the basis of their social preferences (Murphy and Ackermann, 2014). Individuals with prosocial preferences tend to behave more prosocially than individuals with proself preferences because they are happier themselves when others are happier. In recent years, the relationship between prosocial behavior and well-being has been gaining attention, with many studies finding a causal relationship or at least a correlation between the two (Falk and Graeber, 2020; Song et al., 2020; Kushlev et al., 2022; Rinner et al., 2022). Surprisingly, however, little research has been done on the relationship between social preferences and well-being. In general, those with prosocial preferences exhibit greater frequency or degree of prosocial behavior. But because many factors contribute to prosocial behavior, even persons with proself preferences may exhibit prosocial behavior. So are individuals with prosocial preferences happier than individuals with proself preferences? To examine this question scientifically, we need to address two major problems.

The first problem is that no formal theoretical model has yet described the relationship between social preferences and levels of individual well-being. When considering social preferences and well-being, we see that the relationship between relevant variables differs from person to person, and verbal models cannot sufficiently avoid ambiguity. So it is necessary to describe the relationship between social preferences and levels of well-being mathematically. Some studies use verbal models to theoretically analyze the relationship between prosocial behavior and happiness (Carlson et al., 1988; Aknin and Whillans, 2021; Hui, 2022). The present study uses a mathematical model that complements such verbal models.

The second problem is that few studies have empirically examined the relationship between social preferences and well-being (see the “Literature review” section). Because prosocial behavior can be directly observed, it is relatively easy to analyze its relationship with well-being or happiness empirically, which helps explain why there are so many empirical studies of this relationship. Social preferences, on the other hand, cannot be directly observed and must be inferred from individual behavior, making it difficult to explore the relationship between social preferences and happiness. This study investigates the correlation.

It does so by presenting a theoretical framework for analyzing the relationship between social preferences and well-being and providing evidence from survey data of adults in the United States of the positive correlation between prosociality and various domains of subjective well-being. We follow the literature in defining a *social preference* as an individual’s preference regarding the payoffs or well-being of others (Charness and Rabin, 2002;

Levitt and List, 2007). Social preference pertains to how the individual ranks possible combinations of personal payoffs and the payoffs of others. Depending on the degree to which one cares about the interests of others, one’s social preference can be prosocial or non-prosocial.

Like Dixit and Levin (2017) and Tilman et al. (2019), we define *prosociality* as the tendency of an individual to care about the payoffs or well-being of others, which in the literature and in the present paper is mathematically represented by a parameter. Although the concept of prosociality resembles the concept of social preference and is often used interchangeably with it, prosociality differs in that it enables us to think of levels of prosociality, such as high and low levels. Individuals with high prosociality care more about the payoffs of others; individuals with low prosociality care less.

Distinguishing between *preferences* and *behaviors* in accordance with distinctions often made by economists (Samuelson, 1938; Sen, 1973), we assume that individuals engage in prosocial behaviors—behaviors that help or benefit others—on the basis of their social preferences and that persons with higher prosociality are more likely to engage in prosocial behaviors like donating money or volunteering. An enormous literature considers the relationship between prosocial behavior and well-being. Theoretically, the causal relationship between prosocial behavior and happiness is reciprocal: the happiness of people increases when they engage in prosocial behavior, and happier people are more likely to engage in such behavior. Many empirical studies have found only a correlation between the two, but some have also found a causal relationship (Meier and Stutzer, 2008; Aknin et al., 2012; Boenigk and Mayr, 2016; Lawton et al., 2021).

Unlike these studies, the present study examines the relationship between social preferences and happiness rather than between prosocial behavior and happiness. Researchers have shown that social preference or prosociality is relatively stable (Van Lange and Semin-Goossens, 1998; Böhm et al., 2021). Whether social preferences have a fundamental relationship with individual welfare has important implications for how policies and laws enacted with the intention of influencing social preferences in turn affect social welfare, which is the aggregate of individual welfare.

This paper develops a formal theoretical model for analyzing well-being when individuals have heterogeneous social preferences. The model mathematically defines the relationships between social preferences, prosociality, and well-being and describes the hypothesis to be tested by the empirical analysis. We define prosocial preferences as preferences in which, with other conditions being held constant, the level of well-being increases as the payoffs of others increase. We define proself preferences as preferences in which the level of well-being decreases or remains unchanged as the payoffs of others increase. We also define prosociality as a parameter that expresses the degree to which one considers the payoffs of others, and we hypothesize that an increase in prosociality leads to an increase in level of well-being. The theoretical model is developed only to the extent necessary for the empirical analysis and is quite simple.

Then, in the empirical analysis, we test the hypothesis that prosociality is associated with happiness. Researchers have developed various measures of prosociality. We assess it by measuring social value orientation (SVO) using the Slider Measure developed by Murphy et al. (2011), which has been used frequently in recent economics or behavioral economics research (Grosch and Rau, 2017; D’Attoma et al., 2020). The Slider Measure is excellent in that it treats SVO both as a traditional categorical variable and as a continuous variable. We also use the Pemberton Happiness Index developed by Hervás and Vázquez

(2013) to measure aspects of well-being. Their index consists of the sub-domains of remembered and experienced well-being, and remembered well-being consists of general well-being, eudaimonic well-being, hedonic well-being, and social well-being.

To test the hypotheses, regression analysis was conducted with each form of well-being as the dependent variable and with the SVO score (a continuous variable) or the SVO category (a categorical variable) as the independent variable. Parenthood (Pollmann-Schult, 2014; Radó, 2020), political preference (Napier and Jost, 2008; Onraet et al., 2017), income (Boyce et al., 2010; Fitz-Roy and Nolan, 2022), and education (Cuñado and de Gracia, 2012; Nikolaev, 2018), which have been used in previous studies, were also used as independent variables. Gender, age, employment, and marital status were used as control variables.

The regression analysis found a statistically significant positive correlation between SVO and total well-being. Focusing on the subdomains of total well-being, SVO had a statistically significant correlation not only with relatively short-lived hedonic well-being but also with more enduring eudaimonic well-being. The effect sizes of SVO on each of these dimensions of well-being were similar to the effect sizes of parenthood, income, and education, each of which is an important determinant of well-being. The analysis suggests that prosociality is a very important determinant of well-being.

The following section provides a review of the literature. The section on Theory of Heterogeneous Social Preferences and Well-Being presents a theoretical model. The Methodology section describes how the hypothesis that prosociality and happiness are correlated may be tested. The Results section reports the results of the regression analysis. The Conclusions and Discussion section considers implications for policy.

Literature review

Overview of the literature. The present study contributes to three strands of research: social preferences and social value orientation (SVO), subjective well-being, and heterogeneous preferences. We first provide an overview of the literature, then examine the literature on each topic in detail.

In this study, we adopt a theoretical framework which assumes that individuals behave in a prosocial manner on the basis of their social preferences (Murphy and Ackermann, 2014). Individuals with prosocial preferences tend to behave more prosocially than those with proself preferences because the well-being of others has a greater positive impact on their own well-being. Recently, the number of studies on the relationship between prosocial behavior and well-being has been increasing remarkably. They include both empirical studies (Falk and Graeber, 2020; Song et al., 2020; Kushlev et al., 2022; Rinner et al., 2022) and theoretical studies using verbal models (Carlson et al., 1988; Aknin and Whillans, 2021; Hui, 2022). However, in part, because preferences cannot be directly observed, little research has been done on the relationship between social preferences and well-being.

We first mathematically formulate the relationship between social preferences and well-being. Decancq et al. (2017) presented a formal model of the relationship between the heterogeneous preferences and well-being. But because their model does not explicitly consider social preferences, we extend it. In the theoretical model of the present study, preferences that reflect the fact that all other things being equal, one's own well-being increases as the payoffs of others increase are called prosocial preferences.

We then empirically examine the relationship between social preferences and well-being, which raises the question of how to measure these attributes. We look in detail at the literature on

SVO to explain why we measure social preferences using SVO. With respect to well-being, researchers have shown that happiness consists of multiple dimensions. So we explore the literature on various aspects of happiness and its determinants. We also see the literature on heterogeneous preferences to explain why we need to consider heterogeneity for preferences, including social preferences, in considering the effects of policies and laws on society and the economy.

Literature on SVO. Social preference has many dimensions, including SVO and social mindfulness (Van Doesum et al., 2021). This paper focuses on SVO as a variable representing one aspect of social preference because of the large amount of research on it and how easy SVO is to measure. Research on SVO has a long history (Messick and McClintock, 1968; Murphy and Ackermann, 2014), and studies have shown SVO to be a predictor of many behaviors, including volunteer and donation behavior. But these studies have not made clear whether well-being differs among individuals with different SVOs; and, if so, to what extent and in which domains of well-being the differences are manifested. This study provides evidence for these questions.

After mathematician John von Neumann and economist Oskar Morgenstern established the foundations of game theory (Von Neumann and Morgenstern, 1944), it became possible to formally analyze interactions among decision-makers. The analyses usually assumed that in the course of such interactions, each individual pursues only his own self-interest, an assumption that often enabled useful predictions. Other investigators studied cases in which individuals may care about the interests of others as well as their own. Psychologists David Messick and Charles McClintock devised so-called decomposed games, games in which a decision maker has a unilateral choice about how to allocate resources between himself and another person (Messick and McClintock, 1968). Influenced by their study, the concept of SVO eventually emerged.

On the basis of SVO, people can be categorized into two main groups: prosocial and proself (De Cremer and Van Lange, 2001). Proself persons are mainly concerned with their own self-interest; prosocial people care about the interests of others as well as their own. Prosocial and proself groups can, in turn, be subdivided in accordance with specific motivations. The groups most often distinguished are prosocial, individualistic, and competitive (Murphy and Ackermann, 2014). In the case of two persons, a prosocial person maximizes joint gains for himself and the other person. An individualistic person maximizes self-gain, and a competitive person maximizes the difference between self-gain and the other person's gain.

Studies have shown that SVO can predict various behavior. For instance, to study the association between SVO and volunteer behavior, McClintock and Allison (1989) classified students at a US university into three SVO-based groups: prosocial, individualistic, and competitive. The students were asked to volunteer for a psychological research project at their university and to indicate how many hours they would volunteer. Prosocial students devoted more hours to the research. Van Lange et al. (2011) showed that prosocial students at a Netherlands university were more likely than individualistic and competitive students to volunteer for psychological experiments.

Studies have also shown that SVO predicts donating behavior. When Van Lange et al. (2007) asked survey participants in the Netherlands about their donations, they found that prosocial people donated more often than individualistic and competitive people, especially to organizations for poor and ill people. A survey conducted in three regions of Bangladesh by Shahrier et al. (2017) showed that prosocial people donated more money to

humanitarian activities than individualistic and competitive people did. These studies suggest that SVO has predictive power in both developed countries and developing countries.

Literature on subjective well-being. Researchers have studied various determinants of subjective well-being: parenthood (Pollmann-Schult, 2014; Radó, 2020), political preferences (Napier and Jost, 2008; Onraet et al., 2017), income (Boyce et al., 2010; FitzRoy and Nolan, 2022), education (Cuñado and de Gracia, 2012; Nikolaev, 2018). Because these factors play a significant role in social life, they are highly correlated with happiness. How much we care about others plays an important role in social life, so it is natural to assume that social preferences also have a large impact on happiness. But this assumption has not been fully examined in previous studies. The present study shows that prosociality is indeed correlated with happiness, with an effect size similar to the effect sizes of other determinants of happiness.

Measuring subjective well-being is a difficult task. Instances of subjective well-being can be divided into remembered well-being and experienced well-being; i.e., they can be distinguished with respect to when the experiences are being evaluated. Remembered well-being is an evaluation of one's experiences as one remembers them after these experiences are over. Experienced well-being is an evaluation of one's experiences in real-time. Remembered well-being may be biased by imperfect memory, imperfect conditions of evaluation, and other factors (Kahneman and Riis, 2005). Experienced well-being may not fully capture the long-term effects of experiences on well-being (Oliver, 2017). To compensate for their potential incompleteness, these two forms of reporting well-being should be used complementarily.

Remembered well-being can be subdivided into general well-being, eudaimonic well-being, hedonic well-being, and social well-being. General well-being is an evaluation of life satisfaction: a global evaluation of one's life as assessed by one's own criteria (Diener et al., 1985). Eudaimonic well-being is an evaluation of one's actualization of potential. Hedonic well-being is an evaluation of one's balance of pleasure and pain (Ryan and Deci, 2001). Social well-being is an evaluation of one's circumstances and functioning in society (Keyes, 1998).

Eudaimonic and hedonic views of well-being have long histories (Ryan and Deci, 2001). The ancient Greek philosopher Aristotle considered hedonic happiness to be vulgar. He thought that happiness is the actualization of human potential. Another ancient Greek philosopher, Aristippus, thought that the proper goal of life is to maximize pleasure and that happiness is the sum of momentary pleasures. Eudaimonic well-being is often regarded as more enduring than hedonic well-being because the realization of potential is usually not a fleeting phenomenon, whereas simple pleasure and pain tend to be momentary (Steger et al., 2008).

This paper measures remembered well-being (general well-being, eudaimonic well-being, hedonic well-being, and social well-being) and experienced well-being and examines their correlation with social preferences.

Literature on heterogeneous preferences. This study also contributes to the literature on heterogeneous preferences, particularly heterogeneous social preferences. When considering the effects of policies and laws on society and the economy, conclusions may vary depending on the extent to which the relevant preferences of members of society are heterogeneous. For example, Ziegler (2020) showed that persons with prosocial preferences are more likely to enter into green energy contracts because they derive more utility from efforts to protect the environment than those with non-prosocial preferences do. The government could make its renewable energy policy more

effective by making the process of supplying electricity more transparent. Showing that green energy contracts function to protect the environment would appeal to those with prosocial preferences.

In addition, Fehr and Schmidt (1999) showed that when there are social members with different social preferences—selfish individuals and prosocial individuals—the distribution of social preferences affects whether competition or cooperation occurs in equilibrium. Because many policies, such as environmental policies, require the cooperation of social members, the effects of these policies may vary in consequence of the distribution of social preferences.

As these examples show, the effects of policies and laws change depending on the heterogeneity of the social preferences of people. Analysis of the effects of policies and laws on social welfare ultimately requires an aggregation of individual welfare. So it is useful to know how the social preferences of individuals are related to their welfare levels in the first place. Although some recent research, such as the study by Decancq et al. (2017), presents a method of calculating inequality of well-being by considering the heterogeneous preferences of individuals, none has examined in detail the relationship between heterogeneous social preferences and levels of well-being. The present paper identifies a positive correlation between social preferences and welfare levels.

Theory of heterogeneous social preferences and well-being

To structure our thinking, we extend the model of heterogeneous preferences and well-being developed by Decancq et al. (2017) to the case of heterogeneous social preferences.

Suppose that there are n individuals in a society. We assume that the outcomes of life in dimension $m > 1$ affect the well-being of each individual, and we denote the outcome vector for each individual i by $\mathbf{l}_i = (l_i^1, l_i^2, \dots, l_i^m)$. Each person i has a well-behaved preference order R_i for his or her set of outcome vectors. These preferences mean well-considered judgments about what each individual considers to be the good life. We assume that the preference order R_i of each individual i can be expressed as a function of a preference vector consisting of k parameters $\mathbf{a}_i = (a_i^1, a_i^2, \dots, a_i^k)$; that is, $R_i = R(\mathbf{a}_i)$. We assume that the subjective well-being WB of each individual i depends on the outcome vector \mathbf{l}_i and the preference vector \mathbf{a}_i : $WB(\mathbf{l}_i, \mathbf{a}_i)$.

These assumptions are the same as those of the model used by Decancq et al. But because we want to consider social preferences explicitly, we are adding a few more assumptions. Suppose that the subjective well-being WB of each individual i also depends on the outcomes of individuals other than i , and we denote the outcome matrix by $\mathbf{L}_{-i} = (\mathbf{l}_1, \mathbf{l}_2, \dots, \mathbf{l}_{i-1}, \mathbf{l}_{i+1}, \dots, \mathbf{l}_n)$. This means that the well-being WB of each individual i depends not only on \mathbf{l}_i but also on \mathbf{L}_{-i} . Let \mathbf{L} denote the outcomes in the society. Now the well-being WB of each individual i depends on the outcome matrix \mathbf{L} and the preference vector \mathbf{a}_i : $WB(\mathbf{L}, \mathbf{a}_i)$. We also assume that the p th preference parameter of each individual i , a_i^p , is a prosociality parameter, which represents a preference about the outcomes of other individuals \mathbf{L}_{-i} .

Depending on a_i^p , each individual i can have a higher well-being with the same personal outcome \mathbf{l}_i if the outcomes of other individuals in the society \mathbf{L}_{-i} have better values. If for all individuals $j \neq h$ it is the case that $\mathbf{l}_j^* = \mathbf{l}_j$, and for individual h it is the case that for $\delta \in \mathbb{R}_+^m \setminus \{0\}$, $\mathbf{l}_h^* = \mathbf{l}_h + \delta$, we denote the outcome matrix by \mathbf{L}^* . We can now define prosocial preferences.

Definition. Individual i has a prosocial preference $R_i = R(\mathbf{a}_i)$ if

$$WB(\mathbf{L}^*, \mathbf{a}_i) > WB(\mathbf{L}, \mathbf{a}_i) \Leftrightarrow \mathbf{L}^* R(\mathbf{a}_i) \mathbf{L}. \quad (1)$$

On the basis of this definition, it follows that individual i has a non-prosocial preference if $WB(\mathbf{L}^*, \mathbf{a}_i) \leq WB(\mathbf{L}, \mathbf{a}_i)$.

We are interested in whether, in general, individuals with prosocial preferences have a higher level of well-being than individuals with non-prosocial preferences, given the same personal outcome and the same outcomes for others. Suppose that individuals i and j have a different prosocial preference parameter for each other. This means that $a_i^p \neq a_j^p$, where a_i^p is the prosociality parameter for individual i and a_j^p is the prosociality parameter for individual j . Suppose also that individual i has a prosocial preference $R(a_i)$, but individual j has a non-prosocial preference $R(a_j)$. We are interested in whether the following is generally (not always) true in the real world for any outcome L where $l_i = l_j$:

$$WB(L, a_i) > WB(L, a_j). \tag{2}$$

More generally, the level of the prosociality parameter a_i^p of each individual i may be correlated with the level of subjective well-being $WB(L, a_i)$ whether or not the individual's preference is prosocial.

Hypothesis. The level of prosociality is correlated with the level of subjective well-being.

We will now empirically examine this hypothesis.

Methodology

Measurement method of social preferences. We use SVO, an aspect of social preference, as an explanatory variable for well-being; as a continuous variable, SVO represents degree of prosociality. This means that we are using SVO as a proxy variable for the prosociality parameter. Previous studies have developed a variety of methods for measuring SVO (Messick and McClintock, 1968). The present study uses the Slider Measure developed by Murphy et al. (2011), a method that many scholars have begun to use.

In this method, subjects are asked to choose an allocation of gains between the self (the subject) and another person in six different situations.³ In each situation, subjects have nine options for allocating the gains, as shown in Table 1. The gains in the six situations are indicated by the six dotted lines in Fig. 1. The vertical axis represents the gain of the other person, and the horizontal axis represents the gain of the subject. The four points (50, 100), (85, 85), (100, 50), and (85, 15) correspond to idealized altruistic choices, prosocial choices, individualistic choices, and competitive choices that are made when a person chooses an allocation of self-gain and other-gain from allocations located on the circle. The gains in the six situations are located on the six dotted lines that interconnect these four points. Each of the six situations corresponds to one of the six dotted lines.

After a subject chooses allocations in the six situations, the mean gain of the subject \bar{A}_s and the mean gain of the other \bar{A}_o are

calculated. Then 50 is subtracted from each mean gain so that the angle of the point (\bar{A}_s, \bar{A}_o) to the center of the circle (50, 50) can be calculated. The SVO score of each subject is defined as the arctangent of the ratio of these adjusted means:

$$SVO^o = \arctan\left(\frac{\bar{A}_o - 50}{\bar{A}_s - 50}\right), \tag{3}$$

where SVO^o is the SVO score, also called the SVO angle. Murphy et al. recommended that SVO be used as a continuous construct because it measures how much an individual sacrifices in order to make another individual better off.⁴ In any case, the Slider Measure can classify subjects in terms of conventional categories. Based on the SVO scores, subjects can be classified as follows: altruistic ($SVO^o > 57.15$), prosocial ($57.15 > SVO^o > 22.45$), individualistic ($22.45 > SVO^o > -12.04$), and competitive ($-12.04 > SVO^o$). This classification is especially useful for comparing the results of various studies since many studies used this classification before the Slider Measure came into general use.

Measurement method of well-being. Although many methods have been developed to measure different aspects of well-being, most measure only a single domain of well-being. Because our interest lies in the relationship between various domains of well-being and SVO, we want to use a method that subsumes many domains. The Pemberton Happiness Index developed by Hervás and Vázquez (2013) does so.

Hervás and Vázquez combined several widely used scales of well-being in order to measure both remembered well-being and experienced well-being. In the case of remembered well-being, subjects are asked to rate the statements in Table 2 on an 11-point Likert scale (0 = total disagreement, 10 = total agreement). Remembered well-being is measured as the mean score of these 11 ratings. The sum of raw scores divided by 11 provides a mean score ranging from 0 to 10.

Remembered well-being consists of general well-being, eudaimonic well-being, hedonic well-being, and social well-being. General well-being is measured by questions (r1) and (r2) on global life satisfaction (Diener et al., 1985; Ryan and Frederick, 1997). Eudaimonic well-being has six components: life meaning, self-acceptance, personal growth, relatedness, perceived control, and autonomy. These components are based on the model of psychological well-being developed by Ryff (1989). They are measured by statements (r3)–(r8). Hedonic well-being has two components, positive affect, and negative affect, which are based on the Positive and Negative Affect Schedule (PANAS) scale developed by Watson et al. (1988). Positive affect and negative affect are measured by statements (r9) and (r10). Social well-

Table 1 Choices in the Slider Measure.

1	Own	85	85	85	85	85	85	85	85	85
	Other	85	76	68	59	50	41	33	24	15
2	Own	85	87	89	91	93	94	96	98	100
	Other	15	19	24	28	33	37	41	46	50
3	Own	50	54	59	63	68	72	76	81	85
	Other	100	98	96	94	93	91	89	87	85
4	Own	50	54	59	63	68	72	76	81	85
	Other	100	89	79	68	58	47	36	26	15
5	Own	100	94	88	81	75	69	63	56	50
	Other	50	56	63	69	75	81	88	94	100
6	Own	100	98	96	94	93	91	89	87	85
	Other	50	54	59	63	68	72	76	81	85

The author based this table on data provided by Murphy et al. (2011, p. 772).

being is measured by statement (r11) about a person’s situation and functioning in society (Keyes, 1998).

To measure experienced well-being, subjects are asked to answer “yes” or “no” regarding whether the events listed in Table 3 occurred the day before. Items (e1), (e3), (e5), (e7), and (e8) are positive experiences; items (e2), (e4), (e6), (e9), and (e10) are negative experiences. The occurrence of each positive experience is counted as 1, and the nonoccurrence of each negative experience is also counted as 1. The sum of these scores is a single overall score that ranges from 0 (no positive experiences and 5 negative experiences) to 10 (5 positive experiences and no negative experiences).

Total well-being, which includes both remembered well-being and experienced well-being, is calculated by adding a subject’s scores for remembered well-being (11 scores) and experienced well-being (1 score), then dividing this total score by 12 to obtain a mean score that ranges from 0 to 10.

Participants and procedure. The data were collected using Amazon Mechanical Turk (MTurk), an online crowdsourcing platform.⁵ In March 2016, the author recruited participants in the United States.⁶ Power analysis indicated that a sample size of 200 would be sufficient to achieve 80% power, assuming a small to medium effect size. The author, therefore, collected 212 samples. The participants were asked to first complete the Slider Measure, then to complete the questionnaires for the Pemberton Happiness

Index and answer demographic questions. The mean time required to complete the entire procedure was 3 min and 30 s. Each participant received 0.5 US dollars for participating.

Regression model. To analyze the impact of SVO on well-being in a way that takes into account other independent variables, we use regression analysis. This is the regression model:

$$WB_i = \alpha + \beta SVO_i + \gamma'x_i + \delta'z_i + \varepsilon_i. \tag{4}$$

In this model, the dependent variable WB_i is the subjective well-being of individual i . To analyze the multiple aspects of well-being, we use the scores for total well-being, remembered well-being, general well-being, eudaimonic well-being, hedonic well-being, social well-being, and experienced well-being as dependent variables.

The independent variable of interest, SVO_i , is the SVO score of individual i . In our basic model, we follow the recommendation of Murphy et al. (2011) in regarding SVO as a continuous construct and in using the SVO score as an independent variable. In order to compare our results with those of previous studies, we also estimate a model using a binary variable as an independent variable instead of the SVO score. The binary variable classifies individuals into prosocial individuals and individualistic individuals based on their SVO score while leaving other variables unchanged.

The symbol x_i represents a vector of the other independent variables. Researchers have found that many factors affect well-being; in this study, we use parenthood, political preferences, income level, and education level as independent variables.

Despite the costs and stress of child-rearing, in general parenthood positively affects well-being (Pollmann-Schult, 2014;

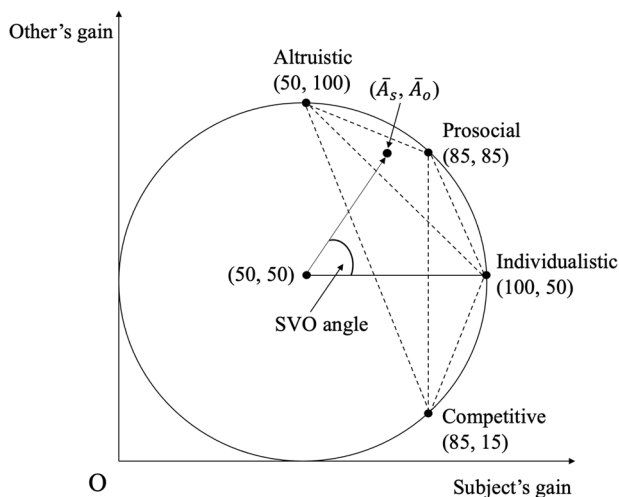


Fig. 1 Plane of the subject's gain and the other's gain. The author made this figure based on the description of Murphy et al. (2011, p. 773).

Table 3 Items measuring experienced well-being.

Items
(e1) Something I did made me proud.
(e2) At times, I felt overwhelmed.
(e3) I did something fun with someone.
(e4) I was bored for a lot of the time.
(e5) I did something I really enjoy doing.
(e6) I was worried about personal matters.
(e7) I learned something interesting.
(e8) I gave myself a treat.
(e9) Things happened that made me really angry.
(e10) I felt disrespected by someone.

Items are taken from Hervás and Vázquez (2013, p. 8).

Table 2 Items measuring remembered well-being.

Subdomains	Items
General	(r1) I am very satisfied with my life. (r2) I have the energy to accomplish my daily tasks.
Eudaimonic	(r3) I think my life is useful and worthwhile. (r4) I am satisfied with myself. (r5) My life is full of learning experiences and challenges that make me grow. (r6) I feel very connected to the people around me. (r7) I feel able to solve the majority of my daily problems.
Hedonic	(r8) I think that I can be myself on the important things. (r9) I enjoy a lot of little things every day.
Social	(r10) I have a lot of bad moments in my daily life. (reverse scoring) (r11) I think that I live in a society that lets me fully realize my potential.

Items are taken from Hervás and Vázquez (2013, p. 8).

Radó, 2020). We use a binary variable that indicates whether a respondent has one or more children as an independent variable. With respect to political preferences, researchers have shown that political conservatives have higher subjective well-being than political liberals (Napier and Jost, 2008; Onraet et al., 2017). We use a categorical variable representing political preferences as an independent variable. Participants are categorized as Republican, Democratic, Independent, or Other. With respect to income, researchers have shown that results vary depending on whether the concept of income rank, relative income, or household income is used; but, in general, income positively affects well-being (Boyce et al., 2010; FitzRoy and Nolan, 2022). We have data only on categories of household income levels, so we treat income as an ordinal variable. Regarding education, researchers have found its impact on well-being to be complex as well. In general, though, higher levels of education positively influence well-being (Cuñaado and de Gracia, 2012; Nikolaev, 2018). We treat education as a categorical variable because we have data on the final educational degrees of the respondents.

The symbol z_i represents a vector of the control variables, including variables indicating gender, age, employment status, and marital status. A variable of gender is a binary variable, and the other variables are categorical. The symbol ε_i is the error term.

Results

We first look at the demographic data of the participants (Table 4). Women constituted 45.3% of all participants, persons younger than 40 constituted 65.2%, persons with a bachelor’s degree or higher 51.4%, wage employees or the self-employed 79.7%, persons with a household income of \$50,000 or more 43.8%, Democrats 50%, Republicans 20.8%, married persons 33.5%, persons with one or more children 41.5%.

Table 5 reports the means, standard deviations (SD), and Pearson correlation coefficients for SVO and well-being variables. The mean SVO score of 23.883 indicates that the average participant was prosocial. The mean score for total well-being was 6.830. The mean scores for remembered well-being and experienced well-being—the subdomains of total well-being—were 6.846 and 6.656, respectively. In the study by Hervás and Vázquez (2013), these scores were similar for the US sample at 6.93 and 6.32, respectively. With respect to the subdomains of remembered well-being, although the mean scores for general well-being, eudaimonic well-being, and hedonic well-being ranged between about 6.7 and 7.1, the mean score for social well-being was 5.925, deviating downward from the other scores.

The SVO was weakly correlated with total well-being, remembered well-being, and hedonic well-being at significance levels of 5%, 5%, and 1%, respectively. Among the correlation coefficients between the SVO and these well-being domains, the coefficient between the SVO and hedonic well-being was the largest at 0.189.⁷ Although not reported in Table 5, the internal consistency of remembered well-being and total well-being, measured by Cronbach’s alpha, were 0.940 and 0.942, respectively. This degree of internal consistency is similar to that found in the study of Hervás and Vázquez (2013), in which these scores were both 0.93 for the US sample.

Table 6 reports the distribution of SVO categories traditionally used in many studies. For the sake of comparison, the distributions of SVO categories in two data sets in Murphy et al. (2011) are reported as well. Their sample was students at a European university, and they used the Slider Measure in their second and third experimental sessions. In the present study, the proportions of altruistic participants, prosocial participants, individualistic participants, and competitive participants were 0.5%, 55.7%, 43.9%, and 0%, respectively. This distribution is similar to the

Table 4 Demographic characteristics of participants (N = 212).

	N	%
<i>Gender</i>		
Woman	96	45.3
Man	116	54.7
<i>Age</i>		
18–22	15	7.1
23–29	58	27.4
30–39	65	30.7
40–49	28	13.2
50–59	32	15.1
60 or more	14	6.6
<i>Education</i>		
High school diploma	29	13.7
Some college/No degree	50	23.6
Associate’s degree	24	11.3
Bachelor’s degree	74	34.9
Master’s degree	25	11.8
Doctoral or professional degree	10	4.7
<i>Employment</i>		
Employed for wages	141	66.5
Self-employed	28	13.2
Unemployed	10	4.8
Homemaker	10	4.7
Student	11	5.2
Retired	5	2.4
Unable to work	7	3.3
<i>Household income</i>		
<\$30,000	59	27.8
\$30,000–\$39,999	29	13.7
\$40,000–\$49,999	31	14.6
\$50,000–\$59,999	29	13.7
\$60,000–\$69,999	16	7.5
\$70,000–\$79,999	11	5.2
\$80,000–\$89,999	9	4.2
\$90,000–\$99,999	5	2.4
\$100,000–\$149,999	14	6.6
\$150,000 or more	9	4.2
<i>Political party preference</i>		
Democratic	106	50.0
Republican	44	20.8
Independent	53	25.0
Other or decline to answer	9	4.2
<i>Marital status</i>		
Married	71	33.5
Widowed	5	2.4
Divorced	12	5.7
Separated	3	1.4
Never married	94	44.3
Partner in an unmarried couple	27	12.7
<i>Having one or more children</i>		
Yes	88	41.5
No	124	58.5

distributions in the study by Murphy et al., in which prosocial participants constituted the majority and individualistic participants constituted the second-largest group. In both studies, altruistic and competitive individuals were rare.

Now let us look at the main results. Table 7 reports the results of ordinary least-squares regression using SVO as a continuous construct, with the SVO score as an independent variable and with total well-being, remembered well-being, general well-being, eudaimonic well-being, hedonic well-being, social well-being, and experienced well-being as dependent variables. The coefficient of SVO was largest at 0.028 when hedonic well-being was a dependent variable. This means that an increase of 1 in SVO

Table 5 Descriptive statistics and correlations for SVO and well-being variables.

	Mean	SD	1	2	3	4	5	6	7
1. SVO	23.883	14.514							
2. Total	6.830	1.810	0.139*						
3. Remembered	6.846	1.819	0.139*	0.996**					
4. General	6.764	1.950	0.074	0.905**	0.904**				
5. Eudaimonic	7.068	1.904	0.132	0.970**	0.978**	0.845**			
6. Hedonic	6.722	2.143	0.189**	0.869**	0.867**	0.724**	0.798**		
7. Social	5.925	2.307	0.076	0.693**	0.691**	0.624**	0.616**	0.480**	
8. Experienced	6.656	2.459	0.094	0.727**	0.667**	0.633**	0.615**	0.627**	0.500**

p* < 0.05; *p* < 0.01.

Table 6 Distributions of SVO categories.

	This study (%)	Murphy et al. Session 2 (%)	Murphy et al. Session 3 (%)
Altruistic	0.5	0	0
Prosocial	55.7	58	64
Individualistic	43.9	39	34
Competitive	0	3	2

The numbers for the second and third columns of data are taken from Table 1 in Murphy et al. (2011, p. 775).

score was associated with an increase of 0.028 in hedonic well-being. The SVO coefficient was about 0.02 when total well-being, remembered well-being, eudaimonic well-being, and experienced well-being were used as dependent variables, and the SVO coefficient was about 0.015 when general well-being and social well-being were used. The SVO coefficient was statistically significant at the 1% level when hedonic well-being was a dependent variable, and it was statistically significant at the 5% level when total well-being, remembered well-being, and eudaimonic well-being were dependent variables.

The coefficients of the other independent variables were generally consistent with the coefficients reported in the studies discussed in the section “Literature review”. The coefficient of parenthood was largest, 0.672, when eudaimonic well-being was a dependent variable, and it was about 0.6 when total well-being, remembered well-being and general well-being were dependent variables. With respect to political preferences, the coefficient for Republican supporters, with Democratic supporters as the reference category, was largest, 0.973, when eudaimonic well-being was a dependent variable; it was about 0.9 when total well-being, remembered well-being and general well-being were dependent variables. These coefficients were statistically significant at the 5% level or at the 1% level.

With respect to household income, the coefficients for the higher income categories were generally positive, with \$30,000 or less as the reference category. For the category of \$70,000–\$79,999 and the category of \$150,000 or more, the coefficients were high, with values greater than 1. Most of these coefficients were statistically significant at the 5% level or 1% level. In 2016, when this study was conducted, the median household income in the United States was \$59,039 (U.S. Census Bureau, 2017). This means that the coefficients of household income were much higher in the income categories that were slightly or extremely above the median income than in the other income categories. With respect to educational degrees, with the category of high school graduate as the reference category, the coefficient for the category of doctoral or professional degree was considerably higher than the coefficients for the other categories.

For the sake of comparing the relative magnitudes of the coefficients, the bottom panel of Table 7 also reports the standardized coefficients. These coefficients indicate by how many standard deviations each dependent variable changes when each independent variable increases by one standard deviation. Looking closely at the regressions for total well-being, we find that the standardized coefficient of SVO was 0.159. At the same time, the standardized coefficients for parenthood, income of \$150,000 or more, and doctoral or professional degree categories were 0.158, 0.167, and 0.176. Thus, the effect size of SVO on total well-being was comparable to the effect sizes of parenthood, income, and education. Looking at the subdomains of total well-being, we obtain similar conclusions for remembered well-being, eudaimonic well-being, and hedonic well-being: the effect sizes of SVO were comparable to the effect sizes of parenthood, income, and education.

Most previous studies treat SVO as a categorical variable. So for the sake of comparison and to provide a check of robustness, Table 8 reports the results of ordinary least-squares regression with the categorical SVO variable as an independent variable. Using the four traditional SVO typologies, we find that the number of observations for the altruistic group in our sample was 1 (0.5%) and that the number of observations for the competitive group was 0 (Table 6). For the sake of convenience, a respondent in the altruistic group was included in the prosocial group.⁸ We use a dummy variable that takes 1 if each individual is prosocial and 0 if each individual is individualistic.

Looking at the results, we find that the coefficients of all variables except SVO and the adjusted *R*-squared values were almost the same as when the continuous SVO variable was used. Focusing on the unstandardized coefficients of SVO that were statistically significant, we see that they were 0.579 for total well-being, 0.566 for remembered well-being, 0.568 for eudaimonic well-being, 0.833 for hedonic well-being, and 0.725 for experienced well-being. This means that when each individual was prosocial, each well-being score was greater by the magnitude of the coefficient than the well-being score when each individual was individualistic. In the case of the regressions for experienced well-being, the coefficient of the continuous SVO variable was not statistically significant. But the coefficient of the categorical SVO variable was statistically significant. We also find that the standardized coefficient of the categorical SVO variable in each regression was almost identical to the standardized coefficient of the continuous SVO variable in each regression. This suggests that when analyzing the relationship between social preferences and well-being, whether one uses a continuous or a categorical SVO variable may not have a significant impact on the conclusions.

Conclusions and discussion

We measured prosociality by using SVO scores and examined the correlations between prosociality and various aspects of well-

Table 7 Regression results with a continuous SVO variable.

	Total	Remember	General	Eudaimonic	Hedonic	Social	Experience
SVO	0.020* (0.009)	0.020* (0.009)	0.016† (0.009)	0.019* (0.009)	0.028** (0.011)	0.015 (0.010)	0.021 (0.013)
Having one or more children	0.580† (0.313)	0.595† (0.316)	0.600† (0.342)	0.672† (0.342)	0.538 (0.401)	0.243 (0.442)	0.406 (0.454)
<i>Political preference (reference = Democratic)</i>							
Republican	0.850* (0.329)	0.877** (0.332)	0.945** (0.354)	0.973** (0.334)	0.678† (0.408)	0.563 (0.450)	0.552 (0.434)
Independent	-0.172 (0.355)	-0.141 (0.352)	-0.113 (0.376)	-0.060 (0.373)	-0.285 (0.403)	-0.402 (0.425)	-0.515 (0.493)
Other/decline to say	-0.012 (0.650)	0.008 (0.648)	-0.083 (0.683)	-0.065 (0.680)	0.406 (0.857)	-0.167 (0.637)	-0.234 (0.814)
<i>Income (reference = <\$30,000)</i>							
\$30,000-\$39,999	0.243 (0.454)	0.261 (0.451)	0.229 (0.464)	0.263 (0.463)	0.452 (0.567)	-0.075 (0.592)	0.052 (0.649)
\$40,000-\$49,999	0.062 (0.463)	0.118 (0.459)	-0.067 (0.540)	0.070 (0.474)	0.240 (0.504)	0.527 (0.638)	-0.551 (0.688)
\$50,000-\$59,999	0.772† (0.461)	0.744 (0.457)	0.555 (0.516)	0.696 (0.457)	0.962† (0.563)	0.976† (0.573)	1.075† (0.638)
\$60,000-\$69,999	0.154 (0.567)	0.131 (0.564)	0.017 (0.631)	0.179 (0.570)	0.291 (0.688)	-0.246 (0.831)	0.399 (0.828)
\$70,000-\$79,999	1.171* (0.553)	1.228* (0.560)	1.571* (0.640)	1.019† (0.609)	1.423* (0.598)	1.411* (0.689)	0.539 (0.730)
\$80,000-\$89,999	0.295 (0.731)	0.364 (0.748)	0.624 (0.772)	0.387 (0.784)	0.542 (0.948)	-0.654 (1.000)	-0.455 (0.802)
\$90,000-\$99,999	0.264 (1.128)	0.315 (1.100)	0.310 (1.006)	0.337 (1.076)	-0.502 (1.638)	1.821 * (0.793)	-0.293 (1.899)
\$100,000-\$149,999	-0.101 (0.558)	-0.080 (0.574)	-0.409 (0.673)	-0.109 (0.662)	0.505 (0.604)	-0.417 (0.696)	-0.327 (0.732)
\$150,000 or more	1.499** (0.476)	1.468** (0.478)	1.542* (0.604)	1.373** (0.468)	1.623* (0.631)	1.583* (0.708)	1.843** (0.661)
<i>Education (reference = High school diploma)</i>							
Some college/No degree	-0.192 (0.427)	-0.172 (0.420)	0.057 (0.431)	-0.377 (0.438)	-0.019 (0.537)	0.297 (0.528)	-0.413 (0.661)
Associate's degree	0.759 (0.551)	0.745 (0.544)	0.792 (0.566)	0.607 (0.558)	0.789 (0.701)	1.396† (0.715)	0.910 (0.759)
Bachelor's degree	-0.154 (0.444)	-0.200 (0.441)	0.230 (0.444)	-0.464 (0.460)	-0.222 (0.547)	0.566 (0.537)	0.347 (0.621)
Master's degree	0.512 (0.426)	0.504 (0.422)	0.447 (0.474)	0.303 (0.446)	0.948† (0.546)	0.936 (0.636)	0.606 (0.739)
Doctoral or professional	1.500** (0.487)	1.482** (0.501)	1.970** (0.530)	1.293* (0.598)	1.550* (0.731)	1.500† (0.874)	1.697 * (0.734)
(Intercept)	5.827** (0.759)	5.859** (0.746)	5.604** (0.794)	6.514** (0.770)	4.520** (0.967)	5.115** (1.004)	5.481** (1.114)
<i>Standardized coefficients</i>							
SVO	0.159	0.157	0.115	0.147	0.187	0.096	0.123
Having one or more children	0.158	0.162	0.152	0.174	0.124	0.052	0.082
Republican	0.191	0.196	0.197	0.208	0.129	0.099	0.091
\$50,000-\$59,999	0.147	0.141	0.098	0.126	0.155	0.146	0.151
\$70,000-\$79,999	0.144	0.150	0.179	0.119	0.148	0.136	0.049
\$150,000 or more	0.167	0.163	0.160	0.146	0.153	0.139	0.151
Master's degree	0.092	0.090	0.074	0.051	0.143	0.131	0.080
Doctoral or professional	0.176	0.173	0.215	0.144	0.154	0.138	0.147
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R ²	0.083	0.088	0.066	0.093	0.072	0.041	0.024

N = 212. Robust standard errors are in parentheses.
**p < 0.01; *p < 0.05; †p < 0.1.

being. With simple correlation analysis, we observed weak correlations that were statistically significant between SVO and total well-being, remembered well-being, and hedonic well-being. When we analyzed the correlations more rigorously with regression analysis using the continuous variable SVO and controlling for the influence of other explanatory variables, SVO had a statistically significant correlation with eudaimonic well-being in addition to the statistically significant correlations with the

other well-being variables. This indicates that prosociality is correlated not only with momentary hedonic well-being but also with more enduring eudaimonic well-being. Looking at the effect sizes of SVO on each dimension of well-being, we saw that the results were similar to the effect sizes of parenthood, income, and education, which are important determinants of well-being.

In regression analyses using the categorical variable SVO, SVO also had a statistically significant correlation with experienced

Table 8 Regression results with a categorical SVO variable.

	Total	Remember	General	Eudaimonic	Hedonic	Social	Experience
SVO	0.579* (0.255)	0.566* (0.254)	0.428 (0.267)	0.568* (0.268)	0.833** (0.306)	0.294 (0.327)	0.725* (0.367)
Having one or more children	0.589† (0.314)	0.605† (0.318)	0.608† (0.343)	0.681* (0.344)	0.549 (0.402)	0.256 (0.443)	0.411 (0.450)
<i>Political preference (reference = Democratic)</i>							
Republican	0.815* (0.325)	0.841* (0.328)	0.916** (0.351)	0.939** (0.331)	0.631 (0.402)	0.527 (0.452)	0.523 (0.425)
Independent	-0.160 (0.355)	-0.129 (0.352)	-0.102 (0.377)	-0.048 (0.373)	-0.269 (0.404)	-0.387 (0.424)	-0.506 (0.493)
Other/decline to say	0.064 (0.627)	0.083 (0.627)	-0.024 (0.669)	0.009 (0.656)	0.512 (0.835)	-0.112 (0.634)	-0.152 (0.789)
<i>Income (reference = <\$30,000)</i>							
\$30,000-\$39,999	0.218 (0.451)	0.234 (0.448)	0.204 (0.460)	0.240 (0.461)	0.423 (0.559)	-0.125 (0.592)	0.050 (0.643)
\$40,000-\$49,999	0.046 (0.462)	0.103 (0.458)	-0.077 (0.540)	0.055 (0.473)	0.215 (0.501)	0.528 (0.641)	-0.578 (0.683)
\$50,000-\$59,999	0.786† (0.458)	0.759† (0.454)	0.566 (0.513)	0.710 (0.453)	0.982† (0.559)	0.989† (0.575)	1.089† (0.642)
\$60,000-\$69,999	0.082 (0.568)	0.060 (0.567)	-0.037 (0.633)	0.109 (0.572)	0.188 (0.693)	-0.290 (0.825)	0.315 (0.820)
\$70,000-\$79,999	1.137* (0.548)	1.193* (0.555)	1.540* (0.637)	0.987 (0.604)	1.381* (0.591)	1.357* (0.684)	0.526 (0.722)
\$80,000-\$89,999	0.211 (0.729)	0.278 (0.746)	0.555 (0.770)	0.306 (0.781)	0.429 (0.942)	-0.740 (0.980)	-0.527 (0.789)
\$90,000-\$99,999	0.438 (1.139)	0.486 (1.110)	0.441 (1.021)	0.507 (1.083)	-0.254 (1.655)	1.924* (0.818)	-0.087 (1.904)
\$100,000-\$149,999	-0.125 (0.562)	-0.104 (0.579)	-0.427 (0.678)	-0.133 (0.666)	0.470 (0.599)	-0.425 (0.705)	-0.361 (0.727)
\$150,000 or more	1.487** (0.486)	1.456** (0.487)	1.531* (0.622)	1.361** (0.468)	1.608* (0.641)	1.568* (0.725)	1.834** (0.679)
<i>Education (reference = High school diploma)</i>							
Some college/No degree	-0.185 (0.423)	-0.164 (0.418)	0.063 (0.427)	-0.370 (0.435)	-0.010 (0.535)	0.306 (0.531)	-0.409 (0.653)
Associate's degree	0.782 (0.552)	0.767 (0.544)	0.808 (0.565)	0.629 (0.558)	0.822 (0.704)	1.402† (0.712)	0.943 (0.759)
Bachelor's degree	-0.161 (0.444)	-0.207 (0.441)	0.223 (0.443)	-0.470 (0.460)	-0.229 (0.546)	0.550 (0.542)	0.347 (0.614)
Master's degree	0.509 (0.426)	0.502 (0.422)	0.448 (0.472)	0.298 (0.446)	0.938† (0.548)	0.959 (0.638)	0.582 (0.735)
Doctoral or professional	1.405** (0.491)	1.386** (0.507)	1.892** (0.523)	1.202* (0.603)	1.423† (0.740)	1.405 (0.886)	1.615* (0.723)
(Intercept)	5.962** (0.755)	5.998** (0.740)	5.722** (0.786)	6.643** (0.762)	4.695** (0.964)	5.292** (0.993)	5.567** (1.127)
<i>Standardized coefficients</i>							
SVO	0.159	0.155	0.109	0.148	0.193	0.063	0.147
Having one or more children	0.161	0.164	0.154	0.177	0.127	0.055	0.083
Republican	0.183	0.188	0.191	0.200	0.120	0.093	0.086
\$50,000-\$59,999	0.150	0.144	0.100	0.128	0.158	0.148	0.153
\$70,000-\$79,999	0.140	0.146	0.176	0.115	0.143	0.131	0.048
\$150,000 or more	0.166	0.162	0.159	0.144	0.152	0.137	0.151
Master's degree	0.091	0.089	0.074	0.051	0.142	0.134	0.076
Doctoral or professional	0.165	0.162	0.206	0.134	0.141	0.129	0.140
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R ²	0.084	0.087	0.064	0.094	0.076	0.036	0.031

N = 212. Robust standard errors are in parentheses.
**p < 0.01; *p < 0.05; †p < 0.1.

well-being. Given the fact that SVO is essentially a continuous variable that expresses how much one sacrifices one's own gain for the gain of others and that the SVO categories were created somewhat artificially for the sake of convenience, the statistical significance of the correlation between the categorical variable SVO and experienced well-being may have arisen by chance. The relationship between SVO and experienced well-being needs to be further researched.

In neither correlation analysis nor regression analysis did SVO have a statistically significant correlation between general well-being and social well-being. This result suggests that there is no difference in the level of happiness between prosocial people and proself people with respect to such aspects of happiness as satisfaction with life in general and satisfaction with society, but that prosocial people are happier than proself people with respect to such aspects as realization of their potential (eudaimonic well-

being) and momentary pleasure and pain (hedonic well-being). We may interpret this fact as meaning that prosocial people can obtain satisfaction with life in general and with society by increasing their own gain but have less opportunity to realize their potential related to helping others and less opportunity to feel pleasure by increasing the gains of others.

One limitation of this study is that it confirmed only a correlation between prosociality and happiness and not also a causal relationship between them. Although we used SVO as a measure of prosociality, SVO pertains to only one aspect of it, and there are other ways to measure prosociality, such as social mindfulness (Van Doesum et al., 2021). It is unclear whether we would obtain similar results by using different measures. Moreover, this study is based on a survey of adults in the United States, and data from other countries are necessary for the sake of external validity. Hopefully, future studies will overcome these limitations by using the present study as a starting point.

This study provides a theoretical foundation for policies and laws that encourage individuals to have prosocial preferences. Various international agreements and laws, especially those pertaining to the environment, have encouraged individuals to take prosocial actions or to have prosocial preferences. Usually, the justification for such policies and laws is that if individuals act only in their own self-interest, the natural environment will be destroyed and the economy and society will eventually be unable to sustain themselves. But such policies and laws can also be justified on the basis of the fact that when individuals have prosocial preferences, this in itself fosters individual welfare, which in turn fosters social welfare as the sum of all individual welfare. Governments, firms, and individuals in various countries may not yet fully recognize the importance of this rationale.

This study also suggests the value of further research about SVO, subjective well-being, heterogeneous preferences, and their interrelationships. For example, the fact that this study found that social preferences affect subjective well-being on the same scale as such determinants as parenthood, income, and education highlights the importance of investigating how countries may foster prosociality. Although educational policies in many countries at least nominally regard cultivation of prosociality as a priority, the true importance of prosociality, including the fact that prosociality is a cause of happiness, has yet to be fully recognized.

Data availability

Owing to ongoing research and analysis, the supporting data are currently available only to bona fide researchers, under the condition of a signed nondisclosure agreement. For details regarding the data and information on how to request access, please contact the corresponding author.

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Notes

- 1 Examples include the European Union's "Directive 2008/99/EC on the protection of the environment through criminal law" and the United Kingdom's "Climate change agreements." For examples of nudging in the environmental arena, see Ghesla et al. (2019) and Wee et al. (2021). Generally, a nudge is any feature of a choice architecture that influences people's behavior in a predictable way without limiting their options or radically changing their incentives (Thaler and Sunstein 2008).
- 2 Another question is whether laws and policies can change individual preferences; and, if they can, whether they can change them in a targeted way (Bowles and Polania-Reyes, 2012). This question is not addressed in the present paper.

- 3 These six items are called primary items. The Slider Measure also includes nine secondary items for analyzing prosocial motivations in further detail, but this paper does not use them.
- 4 One might suppose that our theoretical model differs from the SVO formulation because we considered whether individual well-being would increase only if the gains of others increased, holding other variables constant. However, there is no contradiction in using SVO to measure the prosociality parameter of the theoretical model; measuring how much one's own gain can be reduced for the sake of the gain of others also means measuring how much one's utility increases with an increase in the gain of others.
- 5 This method of collecting data has been used extensively to recruit participants for surveys and experimental studies in social sciences like psychology and economics. Researchers have confirmed that the data collected using MTurk are at least as reliable as data collected by other standard methods, such as by recruiting college students (see Buhrmester et al., 2011).
- 6 The study was conducted in accordance with the ethical standards of the 1964 Declaration of Helsinki and the ethical standards of the author's institution. The author obtained informed consent from all participants.
- 7 Note that although the correlations are high for each of the well-being variables, the regression analysis uses each variable as a dependent variable. So the problem of multicollinearity does not arise.
- 8 Even if a respondent in the altruistic group was excluded from our sample, it does not affect our conclusions.

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Competing interests

The author declares no competing interests.

Ethical approval

This study was conducted in compliance with the ethical standards of the 1964 Declaration of Helsinki and the ethical standards of Stanford University, and the author confirmed with the Stanford University IRB that he was allowed to publish this study.

Informed consent

Each participant in this study voluntarily gave their informed consent after being thoroughly briefed on the nature of the study, the procedures to be followed, their rights as a participant, and any potential risks. This ensured their understanding and willingness to participate.

Additional information

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