PERSONALITY PROCESSES AND INDIVIDUAL DIFFERENCES

Generosity Pays: Selfish People Have Fewer Children and Earn Less Money

Kimmo Eriksson
Stockholm University and Mälardalen University

Irina Vartanova and Pontus Strimling
Institute for Futures Studies

Brent Simpson
University of South Carolina

Does selfishness pay in the long term? Previous research has indicated that being prosocial (or otherish) rather than selfish has positive consequences for psychological well-being, physical health, and relationships. Here we instead examine the consequences for individuals' incomes and number of children, as these are the currencies that matter most in theories that emphasize the power of self-interest, namely economics and evolutionary thinking. Drawing on both cross-sectional (Studies 1 and 2) and panel data (Studies 3 and 4), we find that prosocial individuals tend to have more children and higher income than selfish individuals. An additional survey (Study 5) of lay beliefs about how self-interest impacts income and fertility suggests one reason selfish people may persist in their behavior even though it leads to poorer outcomes: people generally expect selfish individuals to have higher incomes. Our findings have implications for lay decisions about the allocation of scarce resources, as well as for economic and evolutionary theories of human behavior.

Keywords: selfishness, altruism, folk psychology, fertility, income

Supplemental materials: http://dx.doi.org/10.1037/pspp0000213.supp

Much of social life poses a tension between seeing to one's own interests versus attending to the interests of others. Social science has amassed a large body of evidence of individual differences in the relative importance people assign to their own and others' interests under these conditions (Schroeder & Graziano, 2015). This research shows a high degree of variation in the extent to which people are selfish versus prosocial or "otherish."[1] From the vantage point of much theory in biology and the social sciences, this variation is puzzling (Lehmann & Keller, 2006). For instance, rational choice theories conceive of people as maximizing their utility, with selfish individuals deriving utility mainly from their own payoffs and prosocials also deriving utility from outcomes to others. By maximizing their own outcomes, selfish individuals should be better off in the long run than prosocials who are optimizing something else. How then can prosocial behaviors and motivations persist?

The premise that selfishness makes one better off is challenged by a growing body of research showing how selfishness can be disadvantageous (Aknin, Dunn, Whillans, Grant, & Norton, 2013; Grant, 2013; Klapwijk & Van Lange, 2009). A recent review concluded that possessing a prosocial motivation is positively related to psychological well-being, physical health, and social relationships, and conversely, that a selfish motivation is costly in these respects (Crocker, Canevello, & Brown, 2017). Although these findings are interesting and important, self-interest has long held an exalted place in theories of human behavior (Miller, 1999) and these theories may consider well-being and relationships as

[1] We use the terms *prosocial* and *otherish* interchangeably to refer to "wanting or striving to benefit others because one cares about their well-being" (Crocker et al., 2017, p. 308). However, we primarily use the term prosocial for simplicity and given that is the more widely used label. Similarly, following Crocker et al. (2017, p. 312), we "define selfish motivation as the inverse of (prosocial or) otherish motivation: wanting or striving to benefit the self without regard for the well-being of others."

relatively peripheral or a means to more ultimate goals. Specifically, in evolutionary theories and economics, the core question is whether those who are more self-interested have more reproductive success and accumulate more resources, respectively. No prior work has addressed these questions.

Our research asks three interrelated questions. First, does selfishness pay in terms of economic resources, or do selfish individuals tend to have lower incomes than their more prosocial counterparts? Second, does selfishness pay when it comes to fertility, or do prosocials tend to have more children? Finally, do lay intuitions about the relationships between selfishness and income, and selfishness and fertility, align with dominant theories of self-interest and/or the empirical data? This latter question is critical from a rational choice perspective, as it addresses the outcomes people think selfishness optimizes. The sections to follow address each of these questions in more detail.

Selfishness and Income

As noted by Crocker et al. (2017), selfish behavior can lead to greater gains in the short term. In the long run, however, the relation between selfishness and material benefits could be more complex and there are clear bases for competing hypotheses. On the one hand, even over the longer term, we might expect a positive relationship between selfishness and income, because those who value their self-interest will tend to pursue jobs that emphasize greater rewards to themselves, including higher pay and more opportunities for advancement. Similarly, they may be less likely to take on jobs that pay less but promote others' welfare (e.g., school teachers, social workers, police officers, firefighters, etc.).

However, there are also reasons to expect a *negative* relationship between selfishness and income. First, recent work shows that those who are more prosocial and contribute more to groups are granted positions of status (Hardy & Van Vugt, 2006; Willer, 2009) and leadership (Harrell, 2018; Harrell & Simpson, 2016) in those groups. That higher status and leadership positions are also generally accompanied by larger material outcomes implies a negative relationship between selfishness and income. Similarly, many high paying jobs and occupations require the ability to empathize and work well with others. Given that such skills tend to be higher in those with prosocial emotions (Feinberg, Willer, Stellar, & Keltner, 2012; Van Doesum, Van Lange, & Van Lange, 2013), we should expect prosocials to be better off economically.

Further, selfishness has detrimental effects on relationships (Crocker et al., 2017). On the other hand, one of the key reasons why prosociality promotes happiness is because it builds and strengthens relations (Dunn, Gilbert, & Wilson, 2011). Similarly, the sociological literature shows that volunteering promotes higher levels of psychological and emotional well-being because it integrates volunteers in social networks (Musick & Wilson, 2007). Because friends and acquaintances are key sources of information about employment opportunities (Bian, 1997; Granovetter, 1995), selfishness may be detrimental to income via its negative impact on social relations and social capital (Adler & Kwon, 2002). Furthermore, once employed within an organization, those who help others are more likely to be rewarded by managers. For instance, a meta-analysis of the literature on organizational citizenship (Podsakoff, Whiting, Podsakoff, & Blume, 2009) found that managers tend to reward employees who help others at work

(although this may not hold in every organization, see Bergeron, Shipp, Rosen, & Furst, 2013).

Finally, it may be that the relationship between prosociality and income could be nonlinear (Grant & Schwartz, 2011). For instance, compared with more selfish people, moderately prosocial types may experience high incomes via the processes just described, while their very prosocial counterparts experience relatively lower incomes. This would happen if, for instance, the most prosocial types were more apt to focus their efforts on volunteering and helping others in lieu of career advancement, or if they tended to seek out and/or remain in lower paying jobs that emphasized helping others. As suggestive evidence, consider two findings from a study of happiness. Oishi, Diener, and Lucas (2007) found that the relationship between happiness and income was characterized by an inverted U-shape, with the highest income levels found among those reporting moderate levels of happiness. On the other hand, happiness had a strong linear relationship with volunteering, a prosocial behavior. Taken together these two findings suggest that we might expect to find the highest incomes among those who show moderate levels of prosociality.

Selfishness and Fertility

While income is a key outcome variable for management researchers and economists, evolutionary biologists are more concerned with fertility. Of course, these outcomes are not independent; indeed, fertility is negatively related to income in most countries at most times (Jones, Schoonbroodt, & Tertilt, 2008). We now shift our focus to the relation between selfishness and fertility. Some evolutionarily oriented researchers take for granted that, within a group, the most selfish individuals will have the greatest reproductive success and, thus, argue that the degree and diversity of other-oriented behaviors observed in human populations require some additional evolutionary explanation, such as group selection (e.g., Sober & Wilson, 1999). Indeed, explaining the capacity for prosocial behavior is a key topic of theoretical studies of the evolution of human behavior (Cownden, Eriksson, & Strimling, 2017).

While much evolutionary theorizing assumes that selfishness pays in terms of reproductive success, there are also clear reasons to expect a negative relation between selfishness and fertility. Perhaps most obvious is that having a child generally requires extreme attention to his or her needs and interests, very often at a cost to one's own. This suggests that more selfish individuals may be less motivated to have children. Moreover, as noted above, prosociality is associated with better relationships (Crocker et al., 2017), and better relationships may create better opportunities to have one or more children. Despite the importance of this issue for core assumptions underlying evolutionary theorizing, we know of no empirical investigation of the relation between selfishness and fertility in the general population.

What Are Lay Beliefs About How Selfishness Impacts Income and Offspring?

Although some branches of the social and biological sciences give clear predictions that selfishness will pay in income and offspring, whether lay beliefs align with these scientific theories is less clear. Miller (1999; see also Ratner & Miller, 2001) argues

that the ubiquity of the self-interest assumption in economic theories trickles down to influence lay beliefs. Other research has found that people tend to incorrectly assume that spending money on themselves will lead to more happiness gains than spending money on others (Dunn, Aknin, & Norton, 2008). More generally, Crocker et al. (2017, p. 315) state in passing that "people expect selfish motivation to pay off." However, we know of no empirical investigations into lay beliefs about whether selfishness pays in the core life outcomes investigated here. This is an important question from a rational choice perspective, as it addresses whether people believe that selfishness optimizes payoffs. If they do, it would be rational for selfish people to act selfishly.

Although researchers describe negative outcomes of selfishness as paradoxical (Crocker et al., 2017; Konow & Earley, 2008), it seems a priori possible that laypeople view negative outcomes of selfishness as intuitive, that is, consistent with their implicit theories of how psychological traits or social values interact with the social world to produce outcomes. After all, research has shown that folk psychology, or laypersons' intuitive ideas about the mental states and behavior of other people, is not always inaccurate (e.g., Mehl, Gosling, & Pennebaker, 2006). Our question extends the examination of folk psychology to the realms of fundamental human motivations and how they lead to key life outcomes.

Method

To map how selfishness is related to income and fertility, we searched for existing large-scale and representative data sets that include measures of selfishness as well as data on income and number of children. Critically, the literature distinguishes prosocial *motivations* and prosocial *behaviors*, because prosocial behaviors may be driven by either prosocial or selfish motivations (Batson & Powell, 2003; Crocker et al., 2017; Piliavin & Charng, 1990; Simpson & Willer, 2008; Van Lange, Klapwijk, & Van Munster, 2011; Yamagishi et al., 2013). It is, therefore, important to look at both motivations and behaviors. We found two data sets well suited to our research questions, the General Social Survey (GSS) and the European Social Survey (ESS), which are analyzed in Studies 1 and 2, respectively. We then searched for panel data that could shed more light on causality, which yielded the U.K. Household Longitudinal Study (UKHLS) and the Panel Study of Income Dynamics (PSID), analyzed in Studies 3 and 4, respectively. Finally, we conducted a new survey designed specifically to examine people's intuitions about the outcomes of selfishness (Study 5).

As the GSS, ESS, UKHLS, and PSID are publicly available multipurpose data sets, they have been used in much prior research, including numerous studies investigating one or more of our focal variables: prosocial motivation, prosocial behavior, fertility, and income. For instance, several studies have used data from the GSS to examine how well prosocial motivation predicts prosocial behavior, sometimes including income and/or fertility among the covariates (Einolf, 2008; Mesch, Brown, Moore, & Hayat, 2011; Smith, 2009; Wilhelm & Bekkers, 2010). Similarly, Van de Vyver and Abrams (2017) recently used the UKHLS data to study how engagement with the arts predicts prosocial behavior, with income and number of children among the control variables included. The PSID data have been used to examine whether

household income during adolescence predicts prosocial behavior during adulthood (Bandy & Ottoni-Wilhelm, 2012) as well as the correlation between parents' and children's prosocial behaviors and how that correlation compares with the correlation between parents' and children's incomes (Wilhelm, Brown, Rooney, & Steinberg, 2008). The ESS data have been used to examine prosocial motivation and income as predictors of life satisfaction (Georgellis, Tsitsianis, & Yin, 2009). Predictors of fertility have been examined using the GSS data (Fernández & Fogli, 2006), ESS data (Berrington, 2017; Vitali, Billari, Prskawetz, & Testa, 2009), and PSID data (Wang & Famoye, 1997), but none of this research has included measures of prosociality as predictors. In short, we know of no prior work that has used these data sets (or any other data) to study the effects of prosocial motivation and prosocial behavior on fertility and income.

Finally, we should add that it was unnecessary to seek institutional ethical approval for any of the five studies reported here. The Act concerning the Ethical Review of Research Involving Humans (Swedish Statute Book, 2003) states that studies with adults using informed consent need approval only if they use a method intended to physically or mentally influence a person or if they involve sensitive information that can be traced back to individual persons. Neither of these conditions apply to the secondary data analyses of publicly available and fully anonymized data sets (Studies 1–4) or to the anonymous survey of intuitions about the outcomes of selfishness (Study 5).

Study 1: Analysis of the GSS

The GSS (Smith, Marsden, Hout, & Kim, 2015) is a biannual survey asking demographic, behavioral, and attitudinal questions to a representative sample of American respondents. We use data from the four rounds of the GSS (2002, 2004, 2012, and 2014) that included measures of selfishness. Our analyses are based on a sample of 5,294 individuals, 54% women, mean age 47.4 with *SD* 17.4.

Measures

Prosocial motivation.   Three items related to prosocial motivation: "People should be willing to help others who are less fortunate"; "Personally assisting people in trouble is very important to me"; "These days people need to look after themselves and not overly worry about others" (reverse coded). Responses were given on a 4-point scale from *strongly disagree* to *strongly agree* and were averaged to a measure prosocial motivation (Cronbach's $\alpha = .54$). The resulting measure was highly negatively skewed; we bottom-coded it at the lowest percentile to reduce sensitivity to outliers. The measure was then normalized to range between 0 and 1. The final measure had median 0.62, mean 0.56, and *SD* 0.47.

Prosocial behavior.   The selected years of the GSS asked the respondent how often during the last 12 months he or she had engaged in each of 10 helping behaviors (e.g., donating money for charity, offering one's seat on a public transportation). See supplementary material for details. These 10 responses were averaged for our measure of prosocial behavior (Cronbach's $\alpha = .74$). The resulting measure was highly positively skewed; we top-coded it at the highest percentile to reduce sensitivity to outliers. The measure was then normalized to range between 0 and 1. The final measure had median 0.36, mean 0.39, and *SD* 0.45.

Number of children. The number of biological children was measured by the question "How many children have you ever had?" Responses were given as a number.

Income. Income was measured at the household level (annual family income before taxes), as well as at a personal level for those 3,508 respondents who earned any income from employment the year before when the survey was conducted. Income variables were log transformed.

Analysis

Missing values. There were missing data on income (11% for household income; 8% for personal income). Missing data on income could be correlated with prosociality, which might bias results. Following Rubin (1987), we deal with this via multiple imputation (see supplementary information). Our analyses are based on combined results from five imputed data sets.

Exclusion. In the personal income models only, we excluded respondents that do not earn personal income, leaving 3,508 individuals.

Modeling. We used the provided design and poststratification weights in all estimated models. All models include controls for gender, age, ethnicity (White, Black, or other), and year of survey. To account for the fact that age is nonlinearly related to number of children, we control the age effect with penalized cubic splines in generalized additive models, which is a robust way of estimating an underlying smooth function in cases where it is not known (Wood, 2017).

In accordance with the nature of the data, our analyses of number of children use Poisson models, and our analyses of income use linear models. To account for a possibly nonlinear relation between prosociality and income/fertility, we fitted both a linear and a quadratic model and selected the best fitting model according to the Bayesian information criterion (Schwarz, 1978). We present the results of the best fitting models. To ensure that quadratic polynomials represent the underlying nonlinear relationship accurately, the online supplement presents the result of estimating the underlying function using penalized cubic splines instead.

Results

As illustrated in the top left panel of Figure 1, number of children was positively related to prosocial motivation. The unstandardized regression coefficient was $B = 0.10$, 95% confidence interval (CI) [0.01, 0.19]. For prosocial behavior, the best fitting model is shown in the top right panel of Figure 1. It yielded a positive slope, $B = 0.19$, 95% CI [0.08, 0.30] for the linear term, but with a slight U-shape, $B = 0.55$, 95% CI [0.19, 0.91] for the quadratic term. (Note that a positive sign of the coefficient of the quadratic term means a U shape, a negative sign means an inverse U-shape.) However, the quadratic model had only marginal advantage over the linear model, so a purely linear model would be nearly as preferable.

The middle and bottom panels of Figure 1 show that income (whether measured at the personal or household level) was also positively related to having a prosocial *motivation* (household income: $B = 0.33$, 95% CI [0.19, 0.46], personal income $B = 0.21$, 95% CI [0.03, 0.38]). However, the relation between income and prosocial *behavior* was not strictly positive but exhibited an inverse U-shape (household income: $B = 0.04$, 95% CI [−0.14, 0.21] for the linear term and $B = −2.72$, 95% CI [−3.30, −2.15] for the quadratic term; personal income: $B = −0.15$, 95% CI [−0.35, 0.05] for the linear term and $B = −1.76$, 95% CI [−2.46, −1.05] for the quadratic term).

Discussion of Study 1

Our analysis of data from the GSS revealed several key findings. First, regardless of whether we measured selfishness/prosociality via motivations or behaviors, we found that fertility was positively associated with prosociality. Results for income were less straightforward, as they depended on whether prosociality was measured via motivations or reported behaviors. For motivations, we found that prosociality was positively and linearly related to higher levels of income. For behaviors, we found that the highest incomes were associated with moderate levels of prosociality. Before discussing these patterns in greater detail, we assess whether they replicate in a multicountry dataset.

Study 2: Analysis of the ESS

The ESS is a biannual multicountry survey, based on random probability sampling and face-to-face interviews, which monitors public attitudes and values within Europe. For the present paper, we focused on the third round of the European Social Survey (ESS) Round 3 Data (2006), the only round that has information on number of children. The integrated data files provided by the ESS contain third round data on 43,000 respondents from 23 European countries, 54% women, mean age 47.5 with *SD* 18.5.

Measures

Prosocial motivation. The ESS measures respondents' values using short verbal portraits of different people. For each portrait, the respondent is asked "How much like you is this person?" Responses are given on a 6-point scale between *very much like me* (coded as 6) and *not like me at all* (coded as 1). One of the items describes an individual with prosocial motivation: "It's very important to him to help the people around him. He wants to care for their well-being." We use responses to this item as our measure of prosocial motivation. Because less than 0.5% chose the lowest category, we collapsed it with the next category (*not like me*) and rescaled the variable to range between 0 and 1. The final measure had a median of 0.75, $M = 0.67$, and $SD = 0.24$.

Prosocial behavior. Three items in the survey measured prosocial behaviors: (a) "In the past 12 months, how often did you get involved in work for voluntary or charitable organizations?" (b) "Not counting anything you do for your family, in your work, or within voluntary organizations, how often, in the past 12 months, did you actively provide help for other people?" (c) "And in the past 12 months, how often did you help with or attend activities organized in your local area?" Responses were given on a 5-point scale from *at least once a week* (coded as 5) to *less often than once every six months* (coded as 1). Responses on these three items were averaged to create a measure of prosocial behavior (Cronbach's $\alpha = .68$). After rescaling to range between 0 and 1, the measure had a median of 0.27, $M = 0.28$, and $SD = 0.26$.
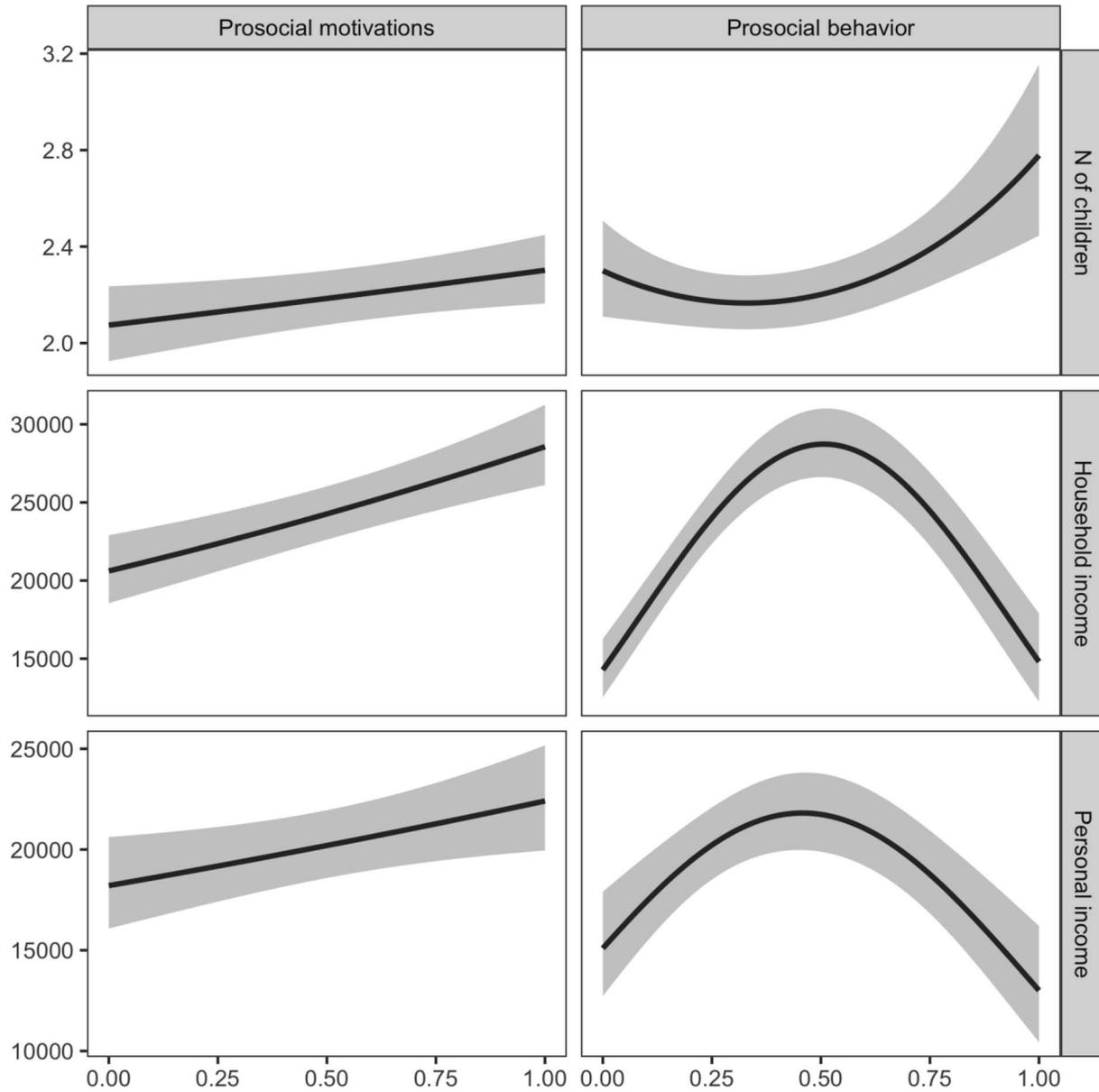
Figure 1. Number of children (top), household income (middle), and personal income (bottom), predicted by prosocial motivation (left) and prosocial behavior (right), controlling for gender and age. Data from the 2002, 2004, 2012, and 2014 waves of the General Social Survey (GSS). Shaded regions represent 95% confidence interval (CI).

Number of children. The number of biological children was measured via the question "How many children have you ever given birth to/fathered?" Responses were given as a number.

Income. Income was measured at the household level via the question "Using this card, if you add up the income from all sources, which letter describes your household's total net income?" In almost all countries, respondents were provided the same 12 categories ranging from a monthly income of *less than €150* to a monthly income of *€10,000 or more*. In Estonia and Ukraine, the question was asked without the card, and responses were subsequently recoded into the above-mentioned categories.

Income categories in Bulgaria, Russia, and Hungary were lower than in the main questionnaire to better represent income distributions in those countries. Given this, we normalize income within each country as *z*-scores.

Analysis

Missing values. The income variable contained a high proportion of missing values, ranging from 4% in Norway to 51% in Portugal. As in Study 1, we dealt with missing data using multiple imputation (see the online supplemental material).

Modeling. ESS data has a multilevel structure with individuals nested in countries. Accordingly, our models include a random intercept with zero mean and estimated variance. All models include controls for gender, age and if respondent belongs to an ethnic minority in the country. The analysis otherwise followed that of Study 1.

Results

The results are displayed in Figure 2. The top left panel shows that number of children was positively related to prosocial motivation $B = 0.12$, 95% CI [0.08, 0.16]. The top right panel shows a positive relation also with prosocial behavior, $B = 0.12$, 95% CI [0.08, 0.16] for the linear term, but with a slight U-shape, $B = 0.17$, 95% CI [0.06, 0.28] for the quadratic term.

The bottom left panel of Figure 2 shows that income was positively related to prosocial motivation, $B = 0.07$, 95% CI [0.01, 0.13] for the linear term, with a tendency toward an inverse U-shape, $B = -0.34$, 95% CI [-0.47, -0.22] for the quadratic term. The bottom right panel illustrates that the same held for the relation between income and prosocial behavior, $B = 0.20$, 95% CI [0.15, 0.25] for the linear term, and $B = -0.63$, 95% CI [-0.80, -0.46] for the quadratic term.

Discussion of Study 2

The European Social Survey data differed from the GSS data in that it covered 23 countries and used different measures of prosocial motivations and behaviors. Nonetheless, this study replicated the finding from the GSS data of a positive association between prosociality and fertility. Moreover, it provided a resolution of the conflicting results about income in the GSS data. Namely, the ESS study suggests both that moderate levels of prosociality are associated with the highest incomes (as the behavioral measure of the

GSS indicated) and that high levels of prosociality are associated with higher incomes than low levels of prosociality (as the motivational measure of the GSS indicated). Reassuringly, as shown in Figure 2, we observed the same relationship between income and prosocial *behaviors* and *motivations* for the ESS data. Note that the inverted U-shape of income in relation to prosociality is also consistent with the argument outlined earlier for why we might expect the highest incomes among the moderately prosocial. That said, Studies 1 and 2 are both limited via the use of cross-sectional data. The next two studies draw on panel data to address whether being prosocial positively influences one's future income and fertility.

Study 3: Analysis of the UKHLS

The UKHLS (University of Essex. Institute for Social and Economic Research, NatCen Social Research, Kantar Public, 2017) is a large-scale panel survey in which members of a representative sample of households in the United Kingdom are followed and interviewed every year. The survey covers a range of social, economic, and behavioral topics. For our purposes, the important feature of the UKHLS is that it began including measures of prosocial behaviors in 2010. Here we ask whether these measures predict number of children and income up to the last available wave in 2016.

The sample for this study includes adult household members (age 16 or older) that were interviewed in 2010 and who were still in the sample in the last available wave in 2016. For the number of children analysis, we included all respondents who were at most 45 years of age by the last time point, totaling 4,402 individuals, 62% women, mean age 29.6 ($SD = 6.1$). For the income analysis, we included all respondents who were employed or self-employed and had incomes at the first time point and at least twice in the follow-up interviews, and who were no more than 65 years of age
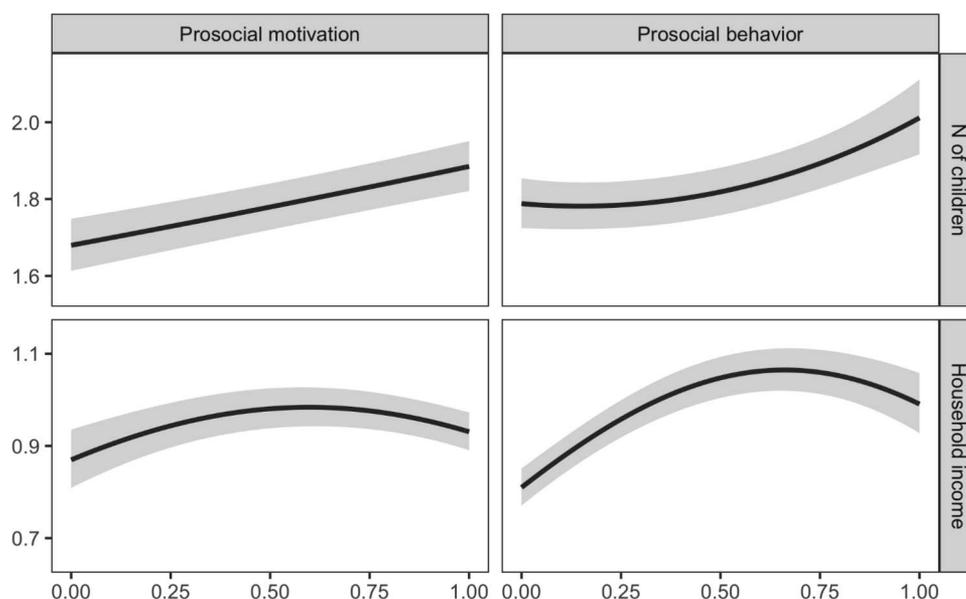

Figure 2. Number of children (top) and household income (bottom) predicted by prosocial motivation (left) and prosocial behavior (right), controlling for gender and age. Data from European Social Survey (ESS) Round 3 (2006). Shaded regions represent 95% confidence interval (CI).

at the last time point, totaling 7221 individuals, 54% women, mean age 42.0 with *SD* 9.6.

Measures

Income. Income is measured as monthly amount of income from work, top coded at £15,000. The measure was log transformed.

Number of children. Respondents indicated the number of biological children when they were interviewed for the first time and the number of newborn children, if any, during the follow-up interviews.

Prosocial behavior. There were two measures of prosocial behavior: amount donated to charity and time spent on volunteering. As described in the supplementary material, these measures were normalized with respect to respondents' income and available time, standardized, and averaged. 37% of the sample had the minimum value of the resulting measure (i.e., they neither donated nor volunteered at all) and were coded as *selfish*. The top 25% were coded as *prosocial*. The 38% in-between were coded as *moderates.*

Analysis

We used the provided longitudinal weights, which correct for panel attrition, unequal probabilities in the originally designed sample, and nonresponse.

Missing data. The income variables are imputed by the data providers. For other variables, the amount of missing values is minimal, being largest at 3% for selfish/prosocial behavior. Because the expected effect of missing values on estimates is minimal, we use only complete cases for the analyses.

Modeling. We use mixed models with survey years nested in individuals, random intercept in both models, and random time slope only in the income model. Random time slope in the number of children model indicated overfit and, thus, was excluded from the final estimation. Both models control for Time × Age, Time × Gender, and ethnicity (White, other or mixed).

Results

Table 1 presents estimates and confidence intervals of starting levels and slopes of the moderates and prosocial categories relative to the selfish category. Results are illustrated in Figure 3. The left

Table 1
Regression Coefficients and 95% CI From UKHLS Data

| Variable | Number of children | | | Income | | |
| | Model 1 | 95% CI | | Model 2 | 95% CI | |
	Estimate	Lower	Upper	Estimate	Lower	Upper
Time	.76	.60	.91	.27	.21	.34
Moderate	−.37	−.49	−.26	.41	.37	.44
Prosocial	−.28	−.42	−.14	.16	.12	.21
Time × Moderate	.32	.17	.46	−.14	−.21	−.07
Time × Prosocial	.24	.06	.41	.10	.02	.19

Note. CI = confidence interval; UKHLS = U.K. Household Longitudinal Study. All models include controls for Time × Age, Time × Sex, and ethnicity.

panel shows that the number of children started highest for respondents in the selfish category (black line) but, importantly, grew faster for moderates (dashed line) and prosocials (dotted line). The right panel of Figure 3 shows that income started highest for moderates but grew fastest for prosocials. Income for those in the selfish category both started lower and grew slower, compared with prosocials.

Discussion of Study 3

Here we used data from the UKHLS to address whether being prosocial has a positive influence on one's future income and fertility. Results were affirmative. Five years after their behavioral prosociality was measured, prosocial respondents had a greater increase in the number of children and a greater increase in income than selfish respondents. Moderately prosocial respondents also had a greater increase in the number of children than did selfish respondents, but not in income.

While these results are consistent with a causal role of prosociality/selfishness in key life outcomes, a limitation of this study is that there were only 5 years between our measure of prosociality and the dependent measures. With a longer time-span, we might see prosocials exceed their more selfish counterparts in total number of children (as we would expect based on the findings in Studies 1 and 2). The data used for Study 4 allow us to address this issue via a more extended time series.

Study 4: Analysis of the PSID

The PSID (Panel Study of Income Dynamics, 2017) is a large-scale panel survey following 5,000 families in the United States. The original sample was initiated in 1968 with individuals from selected households, and their descendants were assessed in follow-up surveys. Here we restrict our sample to those who were interviewed in 2001 when the series of questions for philanthropic behavior were first introduced in the questionnaire. Following the same inclusion criteria as in Study 3, models for the number of children models include 1,759 respondents, 42% women, mean age 25.5 at the first wave with *SD* 3.1. For the income models, we also use the same inclusion criteria as in Study 3, yielding 4,017 respondents, 29% women, mean age 36.6 with *SD* 8.2.

Measures

Income. Income was measured as income from labor for the year before the interview, the sum of several self-reported income components, such as wages and salaries, different kinds of bonuses, overtime, and income from business. The measure was log transformed.

Number of children. PSID records childbirth history for all new members of the panel and updates the information in each interview for all household members. We used child's years of birth to calculate the number of children respondents had in a given interview year.

Prosocial behavior. As in Study 3, respondents were coded as selfish (41%), moderate (34%), or prosocial (25%), based on their donations to charity and volunteering. Details are given in the online supplemental material.
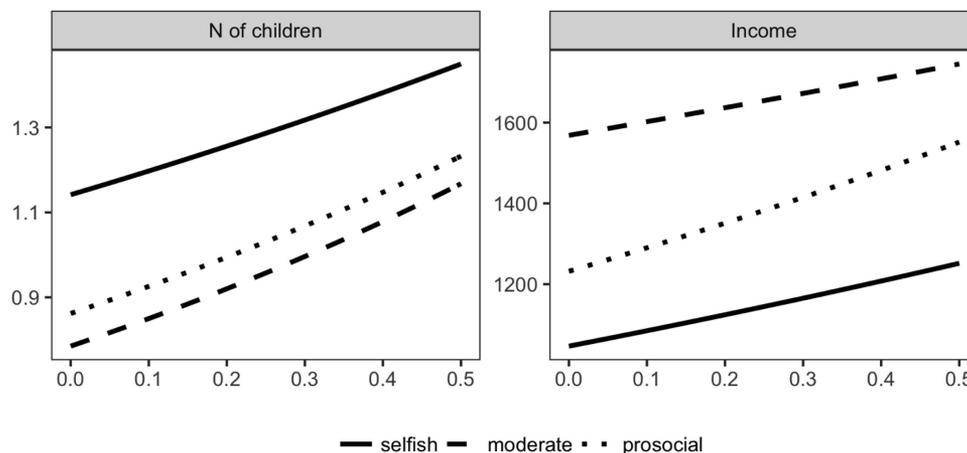
Figure 3. Estimated growth trajectories for number of children (left), and labor income (right) conditioned on selfish, moderate, or prosocial behavior. Data from the U.K. Household Longitudinal Study (UKHLS).

Analysis

Missing data. Our analyses are based on combined results from five imputed data sets, with missing data already imputed by the data providers. However, the data are affected by attrition, which occurs if a respondent withdraws from the study, or if a person who was not a respondent in the original (1968) sample or a descendant of an original respondent moves out of the household. It is possible that attrition might correlate with selfishness and, thus, bias the results. Because longitudinal weights are provided only for those respondents who were part of the original sample and their descendants, using them would significantly reduce the number of eligible cases, especially spouses or partners.

Modeling. We used mixed models with survey years nested in individuals. We used Poisson models for the number of children and linear models for income, with random intercepts in both models and random time slopes only in the income models. A random time slope in the number of children model indicated overfit and, thus, was excluded from the final estimation. Both models control for Time × Age, Time × Gender, and ethnicity.

Married or cohabiting couples are not independent in the sample because charitable donations are reported on the family level and information on volunteering is provided from an interview with only one family member. For this reason, we additionally include a random intercept for couples in the models.

Results

Table 2 reports estimates and confidence intervals of starting levels and slopes. Results are illustrated in Figure 4. First, note that initial levels replicated the pattern of results in Study 3, with selfish respondents (black line) starting out highest on number of children (left panel), and moderates (dashed line) starting out highest on income (right panel). Second, note that the slopes replicated the pattern of results in Study 3, with prosocials (dotted line) showing the largest increase both for number of children and income. More important, by the end of this longer time-span, prosocials were highest both on number of children and income.

Discussion of Study 4

Using data from the PSID in the United States, we analyzed how participants' incomes and number of children developed over 14 years after their behavioral prosociality was measured. The results replicated the findings in Study 3: Prosocial and moderately prosocial respondents had a larger increase in number of children than did selfish respondents, and prosocial respondents had larger increases in income than both selfish and moderately prosocial respondents. More important, at the end of the 14 years, prosocials had both the most children and the highest incomes of all respondents.

Study 5: Intuitions About How Selfishness Pays

Our final study is aimed at examining laypeople's intuitions about the outcomes of selfishness. Do people anticipate the largely negative impact of selfishness on income identified in the previous studies? Or do they believe that selfishness pays?

Method

We recruited 400 respondents from the United States via Amazon Mechanical Turk (mturk.com). The gender distribution was

Table 2
Regression Coefficients and 95% CI From PSID Data

	Number of children			Income		
	Model 1	95% CI		Model 3	95% CI	
Variable	Estimate	Lower	Upper	Estimate	Lower	Upper
Time	.50	.45	.56	.30	.25	.36
Moderate	−.16	−.29	−.03	.33	.26	.41
Prosocial	−.06	−.23	.11	.26	.14	.37
Time × Moderate	.12	.05	.19	−.02	−.08	.04
Time × Prosocial	.11	.03	.20	.07	.01	.13

Note. CI = confidence interval; PSID = Panel Study of Income Dynamics. All models include controls for Time × Age, Time × Sex, and ethnicity.
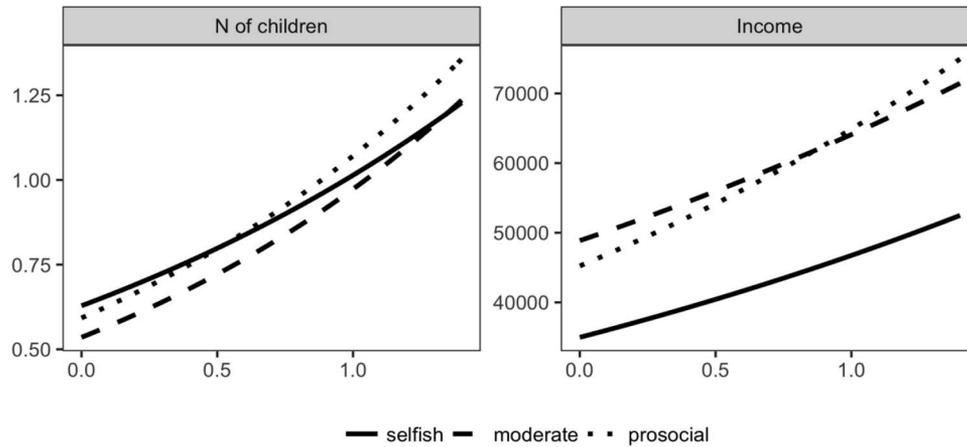
Figure 4. Estimated growth trajectories for number of children (left), and labor income (right) conditioned on selfish, moderate, or prosocial behavior. Data from the Panel Study of Income Dynamics (PSID).

approximately equal (54% male) and respondents had a mean age of 35.2 with *SD* 10.1. The sample size was set in advance to allow estimation of proportions with an inaccuracy (95% CI) of at most 5%. No identifying information was collected.

Instructions for the survey began by defining for participants three categories an individual could belong to, noting that "*otherish*" individuals "think it is very important to help the people around them, and care a lot about the well-being of others;" "*selfish*" individuals are those who are "definitely *not* otherish; it is not very important to them to help the people around them, and they do not much care about the well-being of others;" and that "many individuals lie somewhere between these two poles. We shall refer to such individuals as *inbetween*." Respondents were asked to think about how people in these categories fare in life and answer five questions about them: "On average, which category tends to have the highest number of children; the best physical health; the highest income; the best relationships; the highest psychological well-being?" Each question had four response options: *otherish, selfish, inbetween*, and *no difference between these categories.*

To assess whether perceptions were relatively robust across respondents' own motivation-types, they were then asked to categorize themselves as either *otherish* (36%), *selfish* (8%), *inbetween* (51%), or *do not know* (5%). Finally, as validation of this categorization, we had participants complete a well- established measure of prosociality, the 9-item triple dominance scale for social value orientation (SVO; Van Lange, De Bruin, Otten, & Joireman, 1997). Based on their responses to the triple dominance scale, 66% of respondents were categorized as having a prosocial orientation and 30% as having a proself orientation. As expected, a prosocial orientation was much more common among those who categorized themselves as otherish (77%) than among those who categorized themselves as selfish (41%), odds ratio (*OR*) = 4.85, $p < .001$, 95% CI [2.09, 11.24].

Results

Figure 5 presents the distribution of responses about which category was believed to be the most "successful" for each of the

five outcome variables. Prior research (Crocker et al., 2017) has indicated that prosociality is positively related to the three leftmost outcome variables in Figure 5, namely relationships, psychological well-being, and physical health. Figure 5 shows that respondents' intuitions tended to align with the empirical evidence on relationships and well-being. Specifically, binomial tests showed that it was much more common for participants to believe that prosocial, or otherish, types had better relationships than their selfish counterparts, 54 versus 5%, $p < .001$, and that otherish individuals had higher levels of well-being, 43 versus 8%, $p < .001$. For physical health, however, lay expectations ran counter to the empirical data, with participants believing that otherish individuals would be less apt to be physically healthy than their selfish counterparts, 19 versus 30%, $p = .003$.

Turning to the two outcomes that are the focus on the current research, as Figure 5 shows, intuitions about children were very different from intuitions about income. Respondents were more apt to believe that prosocial, or otherish, types would have more children than would selfish types, 51 versus 10%, $p < .001$, whereas the opposite held for income, 9 versus 68%, $p < .001$.
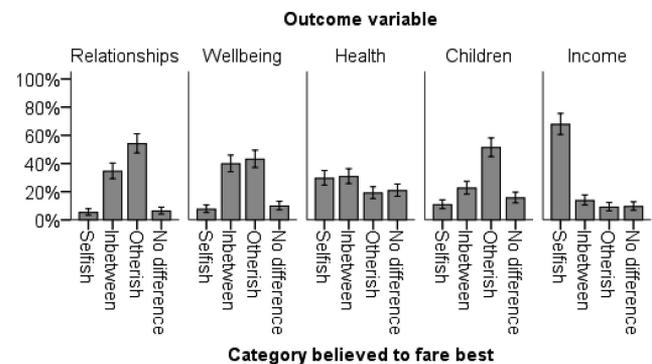

Figure 5. Distribution of responses to which category tends to have the best relationships, the highest psychological well-being, the best physical health; the highest number of children, and the highest income. Error bars indicate 95% confidence intervals (CIs).

More important, as discussed more fully in the supplementary material, these results did not depend on participants' own types.

Discussion of Study 5

This final study checked lay beliefs against empirical data on how selfishness versus prosociality are associated with key life outcomes. Across all outcome variables, a large majority of respondents believed that outcomes were related to selfishness/prosociality, and there was substantial agreement about the direction of that relation for a given outcome variable. Specifically, respondents tended to believe that selfishness is positively associated with success in terms of physical health and income, but negatively associated with success in terms of relationships, psychological well-being, and number of children. We discuss these findings in greater detail below.

General Discussion

Previous research has established a host of positive outcomes of being prosocial rather than selfish, including better social relationships, higher psychological well-being, and better physical health (Algoe, 2012; Crocker et al., 2017; Dunn et al., 2008). Here we asked whether being prosocially motivated and acting in prosocial ways pays off in two currencies central to economic and evolutionary theories, income, and fertility. Money and children are obviously important goals and life outcomes for many people, so it is also of general interest to know whether the paths to these outcomes are more apt to be paved with prosociality or selfishness.

Our first two studies examined cross-sectional data on prosociality and outcomes in the United States (Study 1) and 23 European countries (Study 2). These studies showed that prosocial people tend to have higher fertility and income than selfish people, but that the relation with income was not strictly linear—the largest incomes tended to be found among moderately prosocial people. To assess causality, the next two studies used panel data from the United Kingdom (Study 3) and the United States (Study 4). We found that those who reported higher levels of prosocial behaviors at one point in time experienced larger increases in the number of children and income in subsequent years. Perhaps most importantly, Study 4 showed that, by the final wave of data, prosocials had both the most children and the highest incomes of all respondents.

Before discussing the implications of these findings, we wish to draw attention to some strengths and limitations of the studies just presented. An obvious strength is that we were able to analyze the relation between our focal variables in four different large data sets, using different measures (of both motivations and behaviors) and covering a wide range of different countries. This helped establish the robustness of our key findings. Another important strength is the use of two panel data sets to establish evidence of the impact of prosociality on subsequent fertility and income, in support of a causal relationship. The most important limitation of our data is that they do not allow us to isolate the specific mechanisms responsible for the relationships we observed. Relatedly, our analyses only included those control variables that would be most likely to lead to spurious relations between our independent and dependent variables of interest (e.g., gender, age, and ethnicity). Other control variables (e.g., religiosity or education),

could be included in future analyses aimed at testing underlying mechanisms. A final possible limitation is that we conceptualized and measured prosociality/otherishness and selfishness as ends on a continuum. Although this is consistent with much prior work (Balliet, Parks, & Joireman, 2009; Crocker et al., 2017; Piliavin & Charng, 1990; Simpson & Willer, 2008), other research conceptualizes otherishness and selfishness as relatively independent (Grant, 2013). For instance, one's motivation to care about others could stem from a selfish desire to secure one's own position in social relationships (Fritz & Helgeson, 1998). Our research does not account for the possibility that prosociality and selfishness may be relatively orthogonal, but this could be addressed in future work with different measures of prosociality and selfishness. With these limitations in mind, we next turn to a discussion of the implications of our findings and suggest some possibilities for future research.

Results from all studies tell a consistent and straightforward story for fertility: prosociality leads to more children. What mechanisms may account for this outcome? We think there are at least two main possibilities. Compared with prosocials, selfish individuals may simply be less interested in having children, given the time, money and other forms of self-sacrifice that having and raising children typically entails. Another possibility is that because selfish individuals have lower quality relationships (Canevello & Crocker, 2010; Crocker et al., 2017; Hadden, Smith, & Knee, 2014), they have fewer opportunities to have children. These hypotheses are testable, but we know of no extant data that speak to them.

The finding that more prosocial people tend to have more children may have important implications for evolutionary theories. From one perspective, it would suggest that humanity may be evolving toward lower levels of selfishness. Note, however, that while selfishness/prosociality is heritable, existing studies show that the heritability is not very high; twin studies of self-reported altruism have yielded estimates of heritability between 0 and 50% (Bouchard & Loehlin, 2001; Krueger, Hicks, & McGue, 2001; Rushton, 2004; Rushton, Fulker, Neale, Nias, & Eysenck, 1986), and a large twin study of charitable donations estimated the heritability at 22% (Cesarini, Dawes, Johannesson, Lichtenstein, & Wallace, 2009). These findings indicate a strong influence of environmental factors. Even if genes promoting selfishness tend to become less common in the population, the total level of selfish behavior in society is likely to be more strongly determined by norms, institutions, and other societal factors.

Our findings also speak to theories of the evolutionary history of prosociality in humans. It is often assumed that evolution promotes selfishness unless group selection acts as a counterforce (Sober & Wilson, 1999), possibly combined with a punishment mechanism to offset the advantage of being selfish (Henrich & Boyd, 2001). The finding that prosociality is associated with greater fertility within populations indicates that selfishness is not necessarily advantageous in the first place. Our data sets are limited to Europe and the United States, but if the mechanisms we sketched above are correct then we should also expect a similarly positive effect of prosociality on fertility in other parts of the world.

These findings echo other work on the evolutionary advantages of prosociality. For instance, as noted earlier, prior work shows that prosociality begets status (Hardy & Van Vugt, 2006; Willer, 2009) and leadership positions (Harrell, 2018; Harrell & Simpson, 2016), which produce a wide array of downstream benefits (Ridge-

way & Nakagawa, 2014; Willer, Feinberg, Irwin, Schultz, & Simpson, 2010). Likewise, research on cooperation in "noisy" environments show that generous strategies fare better than both selfish and strictly reciprocal strategies (Nowak & Sigmund, 1993). This is because strictly reciprocal strategies can trigger unnecessary cycles of recrimination when a kind or benign behavior gets misinterpreted as driven by selfishness and begets a retaliatory response. In the real world, where the match between intentions and impact is not always clear cut, more prosocial strategies can win out by building and maintain trust between interaction partners, which helps to buffer against the effects of misunderstandings (Klapwijk & Van Lange, 2009).

Our results paint a somewhat more complex picture for income, compared with fertility. Whereas prosocial people tended to show the largest increases in incomes over time, the majority of our studies indicated that moderately prosocial people had the highest absolute levels of income (but see the results of Study 4 for an important exception). There are several ways in which prosociality may influence income levels and trajectories. As noted earlier, prosocials tend to have better social relations and are more integrated into social networks, which are key sources of information about new or better job opportunities (Granovetter, 1995). We also expect prosociality to influence the occupations people choose, which might explain why strongly prosocial types have lower incomes than their more moderately prosocial counterparts in the cross-section (Studies 1 and 2). At the same time, prosociality is associated with a number of benefits at work, including greater chances of rewards and promotions (Podsakoff et al., 2009), which could explain the more positive income trajectories of prosocial people over time (Studies 3 and 4). That said, income trajectories are inherently different between occupations. Future research may refine the study of how prosociality relates to income by explicitly taking occupations into account.

In Study 5 we examined whether a sample of Americans were aware of the negative effects of selfishness. For the most part, they turned out to have accurate intuitions—especially about the negative associations that selfishness has with social relations, psychological well-being, and number of children. Thus, whereas Crocker et al. (2017, p. 315) call the finding that selfishness does not promote well-being paradoxical, our study indicates that laypeople do not view it as such. Instead, the empirical finding that runs counter to lay intuitions is that selfishness is not associated with the highest incomes. Given people's expectations, this finding is the real paradox of self-interested behavior. If people understood that prosociality pays, then selfish people might engage in more prosociality for selfish reasons. Under their incorrect beliefs, however, it is rational for selfish people to act selfishly.

References

Adler, P. S., & Kwon, S. W. (2002). Social capital: Prospects for a new concept. *Academy of Management Review, 27,* 17–40. http://dx.doi.org/10.5465/amr.2002.5922314

Aknin, L. B., Dunn, E. W., Whillans, A. V., Grant, A. M., & Norton, M. I. (2013). Making a difference matters: Impact unlocks the emotional benefits of prosocial spending. *Journal of Economic Behavior & Organization, 88,* 90–95.

Algoe, S. B. (2012). Find, remind, and bind: The functions of gratitude in everyday relationships. *Social and Personality Psychology Compass, 6,* 455–469. http://dx.doi.org/10.1111/j.1751-9004.2012.00439.x

Balliet, D., Parks, C., & Joireman, J. (2009). Social value orientation and cooperation in social dilemmas: A meta-analysis. *Group Processes & Intergroup Relations, 12,* 533–547. http://dx.doi.org/10.1177/1368430209105040

Bandy, R., & Ottoni-Wilhelm, M. (2012). Family structure and income during the stages of childhood and subsequent prosocial behavior in young adulthood. *Journal of Adolescence, 35,* 1023–1034. http://dx.doi.org/10.1016/j.adolescence.2012.02.010

Batson, C. D., & Powell, A. A. (2003). Altruism and prosocial behavior. In T. Millon & M. J. Lerner (Eds.), *Handbook of psychology: Volume 5. Personality and social psychology* (pp. 463–484). Hoboken, NJ: Wiley.

Bergeron, D. M., Shipp, A. J., Rosen, B., & Furst, S. A. (2013). Organizational citizenship behavior and career outcomes: The cost of being a good citizen. *Journal of Management, 39,* 958–984. http://dx.doi.org/10.1177/0149206311407508

Berrington, A. (2017). Childlessness in the U. K. In M. Kreyenfeld & D. Konietzka (Eds.), *Childlessness in Europe: Contexts, causes, and consequences* (pp. 57–76). Cham, Switzerland: Springer. http://dx.doi.org/10.1007/978-3-319-44667-7_3

Bian, Y. (1997). Bringing strong ties back in: Indirect ties, network bridges, and job searches in China. *American Sociological Review, 62,* 366–385. http://dx.doi.org/10.2307/2657311

Bouchard, T. J., Jr., & Loehlin, J. C. (2001). Genes, evolution, and personality. *Behavior Genetics, 31,* 243–273. http://dx.doi.org/10.1023/A:1012294324713

Canevello, A., & Crocker, J. (2010). Creating good relationships: Responsiveness, relationship quality, and interpersonal goals. *Journal of Personality and Social Psychology, 99,* 78–106. http://dx.doi.org/10.1037/a0018186

Cesarini, D., Dawes, C. T., Johannesson, M., Lichtenstein, P., & Wallace, B. (2009). Genetic variation in preferences for giving and risk taking. *The Quarterly Journal of Economics, 124,* 809–842. http://dx.doi.org/10.1162/qjec.2009.124.2.809

Cowden, D., Eriksson, K., & Strimling, P. (2017). A popular misapplication of evolutionary modeling to the study of human cooperation. *Evolution and Human Behavior, 38,* 421–427. http://dx.doi.org/10.1016/j.evolhumbehav.2017.01.004

Crocker, J., Canevello, A., & Brown, A. A. (2017). Social motivation: Costs and benefits of selfishness and otherishness. *Annual Review of Psychology, 68,* 299–325. http://dx.doi.org/10.1146/annurev-psych-010416-044145

Dunn, E. W., Aknin, L. B., & Norton, M. I. (2008). Spending money on others promotes happiness. *Science, 319,* 1687–1688. http://dx.doi.org/10.1126/science.1150952

Dunn, E. W., Gilbert, D. T., & Wilson, T. D. (2011). If money doesn't make you happy, then you probably aren't spending it right. *Journal of Consumer Psychology, 21,* 115–125. http://dx.doi.org/10.1016/j.jcps.2011.02.002

Einolf, C. J. (2008). Empathic concern and prosocial behaviors: A test of experimental results using survey data. *Social Science Research, 37,* 1267–1279. http://dx.doi.org/10.1016/j.ssresearch.2007.06.003

European Social Survey (ESS) Round 3 Data. (2006). Data file edition 3.6. NSD - Norwegian Centre for Research Data, Norway—Data Archive and distributor of ESS data for ESS ERIC.

Feinberg, M., Willer, R., Stellar, J., & Keltner, D. (2012). The virtues of gossip: Reputational information sharing as prosocial behavior. *Journal of Personality and Social Psychology, 102,* 1015–1030. http://dx.doi.org/10.1037/a0026650

Fernández, R., & Fogli, A. (2006). Fertility: The role of culture and family experience. *Journal of the European Economic Association, 4,* 552–561. http://dx.doi.org/10.1162/jeea.2006.4.2-3.552

Fritz, H. L., & Helgeson, V. S. (1998). Distinctions of unmitigated communion from communion: Self-neglect and overinvolvement with others. *Journal of Personality and Social Psychology, 75,* 121–140. http://dx.doi.org/10.1037/0022-3514.75.1.121

Georgellis, Y., Tsitsianis, N., & Yin, Y. P. (2009). Personal values as mitigating factors in the link between income and life satisfaction: Evidence from the European Social Survey. *Social Indicators Research, 91,* 329–344. http://dx.doi.org/10.1007/s11205-008-9344-2

Granovetter, M. (1995). *Getting a job: A study of contacts and careers.* Chicago, IL: University of Chicago Press.

Grant, A. M. (2013). *Give and take: A revolutionary approach to success.* New York, NY: Penguin.

Grant, A. M., & Schwartz, B. (2011). Too much of a good thing: The challenge and opportunity of the inverted U. *Perspectives on Psychological Science, 6,* 61–76. http://dx.doi.org/10.1177/1745691610393523

Hadden, B. W., Smith, C. V., & Knee, C. R. (2014). The way I make you feel: How relatedness and compassionate goals promote partner's relationship satisfaction. *The Journal of Positive Psychology, 9,* 155–162. http://dx.doi.org/10.1080/17439760.2013.858272

Hardy, C. L., & Van Vugt, M. (2006). Nice guys finish first: The competitive altruism hypothesis. *Personality and Social Psychology Bulletin, 32,* 1402–1413. http://dx.doi.org/10.1177/0146167206291006

Harrell, A. (2018). Competition for leadership promotes contributions to collective action. *Social Forces.* Advance online publication. http://dx.doi.org/10.1093/sf/soy017

Harrell, A., & Simpson, B. (2016). The dynamics of prosocial leadership: Power and influence in collective action groups. *Social Forces, 94,* 1283–1308. http://dx.doi.org/10.1093/sf/sov110

Henrich, J., & Boyd, R. (2001). Why people punish defectors. Weak conformist transmission can stabilize costly enforcement of norms in cooperative dilemmas. *Journal of Theoretical Biology, 208,* 79–89. http://dx.doi.org/10.1006/jtbi.2000.2202

Jones, L. E., Schoonbroodt, A., & Tertilt, M. (2008). *Fertility theories: Can they explain the negative fertility-income relationship?* (NBER Working Paper 14266). National Bureau of Economic Research.

Klapwijk, A., & Van Lange, P. A. (2009). Promoting cooperation and trust in "noisy" situations: The power of generosity. *Journal of Personality and Social Psychology, 96,* 83–103. http://dx.doi.org/10.1037/a0012823

Kleinke, K. (2017). Multiple imputation under violated distributional assumptions: A systematic evaluation of the assumed robustness of predictive mean matching. *Journal of Educational and Behavioral Statistics, 42,* 371–404. http://dx.doi.org/10.3102/1076998616687084

Konow, J., & Earley, J. (2008). The hedonistic paradox: Is *homo economics* happier? *Journal of Public Economics, 92,* 1–33. http://dx.doi.org/10.1016/j.jpubeco.2007.04.006

Krueger, R. F., Hicks, B. M., & McGue, M. (2001). Altruism and antisocial behavior: Independent tendencies, unique personality correlates, distinct etiologies. *Psychological Science, 12,* 397–402. http://dx.doi.org/10.1111/1467-9280.00373

Lehmann, L., & Keller, L. (2006). The evolution of cooperation and altruism—A general framework and a classification of models. *Journal of Evolutionary Biology, 19,* 1365–1376. http://dx.doi.org/10.1111/j.1420-9101.2006.01119.x

Mehl, M. R., Gosling, S. D., & Pennebaker, J. W. (2006). Personality in its natural habitat: Manifestations and implicit folk theories of personality in daily life. *Journal of Personality and Social Psychology, 90,* 862–877. http://dx.doi.org/10.1037/0022-3514.90.5.862

Mesch, D. J., Brown, M. S., Moore, Z. I., & Hayat, A. D. (2011). Gender differences in charitable giving. *International Journal of Nonprofit and Voluntary Sector Marketing, 16,* 342–355. http://dx.doi.org/10.1002/nvsm.432

Miller, D. T. (1999). The norm of self-interest. *American Psychologist, 54,* 1053–1060. http://dx.doi.org/10.1037/0003-066X.54.12.1053

Musick, M. A., & Wilson, J. (2007). *Volunteers: A social profile.* Bloomington: Indiana University Press.

Nowak, M., & Sigmund, K. (1993). A strategy of win-stay, lose-shift that outperforms tit-for-tat in the Prisoner's Dilemma game. *Nature, 364,* 56–58. http://dx.doi.org/10.1038/364056a0

Oishi, S., Diener, E., & Lucas, R. E. (2007). The optimum level of well-being: Can people be too happy? *Perspectives on Psychological Science, 2,* 346–360. http://dx.doi.org/10.1111/j.1745-6916.2007.00048.x

Panel Study of Income Dynamics. (2017). *Public use dataset.* Produced and distributed by the Survey Research Center, Institute for Social Research, University of Michigan, Ann Arbor, MI.

Piliavin, J. A., & Charng, H. W. (1990). Altruism: A review of recent theory and research. *Annual Review of Sociology, 16,* 27–65. http://dx.doi.org/10.1146/annurev.so.16.080190.000331

Podsakoff, N. P., Whiting, S. W., Podsakoff, P. M., & Blume, B. D. (2009). Individual- and organizational-level consequences of organizational citizenship behaviors: A meta-analysis. *Journal of Applied Psychology, 94,* 122–141. http://dx.doi.org/10.1037/a0013079

Ratner, R. K., & Miller, D. T. (2001). The norm of self-interest and its effects on social action. *Journal of Personality and Social Psychology, 81,* 5–16. http://dx.doi.org/10.1037/0022-3514.81.1.5

Ridgeway, C. L., & Nakagawa, S. (2014). Status. In J. D. McLeod, E. J. Lawler, & M. Schwalbe (Eds.), *Handbook of the social psychology of inequality* (pp. 3–25). Dordrecht, the Netherlands: Springer Netherlands.

Rubin, D. B. (1987). *Multiple imputation for nonresponse in surveys.* New York, NY: Wiley. http://dx.doi.org/10.1002/9780470316696

Rushton, J. P. (2004). Genetic and environmental contributions to prosocial attitudes: A twin study of social responsibility. *Proceedings of the Royal Society of London, Series B: Biological Sciences, 271,* 2583–2585. http://dx.doi.org/10.1098/rspb.2004.2941

Rushton, J. P., Fulker, D. W., Neale, M. C., Nias, D. K., & Eysenck, H. J. (1986). Altruism and aggression: The heritability of individual differences. *Journal of Personality and Social Psychology, 50,* 1192–1198. http://dx.doi.org/10.1037/0022-3514.50.6.1192

Schroeder, D. A., & Graziano, W. G. (Eds.). (2015). *Oxford Library of Psychology. The Oxford handbook of prosocial behavior.* New York, NY: Oxford University Press.

Schwarz, G. (1978). Estimating the dimension of a model. *Annals of Statistics, 6,* 461–464. http://dx.doi.org/10.1214/aos/1176344136

Simpson, B., & Willer, R. (2008). Altruism and indirect reciprocity: The interaction of person and situation in prosocial behavior. *Social Psychology Quarterly, 71,* 37–52. http://dx.doi.org/10.1177/019027250807100106

Smith, T. W. (2009). Loving and caring in the United States: Trends and correlates of empathy, altruism, and related constructs. In B. Fehr, S. Sprecher, & L. G. Underwood (Eds.), *The science of compassionate love: Theory, research, and applications* (pp. 79–119). Chichester, UK: Wiley. http://dx.doi.org/10.1002/9781444303070.ch4

Smith, T. W., Marsden, P., Hout, M., & Kim, J. (2015). *General Social Surveys, 1972–2014 [machine-readable data file]/Principal Investigator, Tom W. Smith; Co-Principal Investigator, Peter V. Marsden; Co-Principal Investigator, Michael Hout; Sponsored by National Science Foundation.* Chicago, IL: NORC at the University of Chicago [producer]; Storrs, CT: The Roper Center for Public Opinion Research, University of Connecticut [distributor]. 1 data file (57,061 logical records) + 1 codebook (3,567p.). (National Data Program for the Social Sciences, No. 22).

Sober, E., & Wilson, D. S. (1999). *Unto others: The evolution and psychology of unselfish behavior* (No. 218). Cambridge, MA: Harvard University Press.

Swedish Statute Book. (2003). The Act concerning the Ethical Review of Research Involving Humans (2003:460). Swedish Code of Statutes: The Ministry of Education and Cultural Affairs.

University of Essex. Institute for Social and Economic Research, NatCen Social Research, Kantar Public. (2017). *Understanding society: Waves 1–7, 2009–2016 and Harmonised BHPS: Waves 1–18, 1991–2009* [data collection] 9th Edition. U.K. Data Service. SN: 6614.

van Buuren, S. (2012). *Flexible imputation of missing data.* Boca Raton, FL: CRC Press. http://dx.doi.org/10.1201/b11826

Van de Vyver, J., & Abrams, D. (2017). The arts as a catalyst for human prosociality and cooperation. *Social Psychological & Personality Science*. Advance online publication. http://dx.doi.org/10.1177/1948550617720275

Van Doesum, N. J., Van Lange, D. A., & Van Lange, P. A. (2013). Social mindfulness: Skill and will to navigate the social world. *Journal of Personality and Social Psychology, 105,* 86–103. http://dx.doi.org/10.1037/a0032540

Van Lange, P. A. M., De Bruin, E. M., Otten, W., & Joireman, J. A. (1997). Development of prosocial, individualistic, and competitive orientations: Theory and preliminary evidence. *Journal of Personality and Social Psychology, 73,* 733–746. http://dx.doi.org/10.1037/0022-3514.73.4.733

Van Lange, P. A., Klapwijk, A., & Van Munster, L. M. (2011). How the shadow of the future might promote cooperation. *Group Processes & Intergroup Relations, 14,* 857–870. http://dx.doi.org/10.1177/1368430211402102

Vitali, A., Billari, F. C., Prskawetz, A., & Testa, M. R. (2009). Preference theory and low fertility: A comparative perspective. *European Journal of Population, 25,* 413–438. http://dx.doi.org/10.1007/s10680-009-9178-x

Wang, W., & Famoye, F. (1997). Modeling household fertility decisions with generalized Poisson regression. *Journal of Population Economics, 10,* 273–283. http://dx.doi.org/10.1007/s001480050043

Wilhelm, M. O., & Bekkers, R. (2010). Helping behavior, dispositional empathic concern, and the principle of care. *Social Psychology Quarterly, 73,* 11–32. http://dx.doi.org/10.1177/0190272510361435

Wilhelm, M. O., Brown, E., Rooney, P. M., & Steinberg, R. (2008). The intergenerational transmission of generosity. *Journal of Public Economics, 92,* 2146–2156. http://dx.doi.org/10.1016/j.jpubeco.2008.04.004

Willer, R. (2009). Groups reward individual sacrifice: The status solution to the collective action problem. *American Sociological Review, 74,* 23–43. http://dx.doi.org/10.1177/000312240907400102

Willer, R., Feinberg, M., Irwin, K., Schultz, M., & Simpson, B. (2010). The trouble with invisible men. In S. Hitlin & S. Vaisey (Eds.), *Handbook of the sociology of morality* (pp. 315–330). New York, NY: Springer. http://dx.doi.org/10.1007/978-1-4419-6896-8_17

Wood, S. N. (2017). *Generalized additive models: An Introduction with R.* Boca Raton, FL: CRC Press.

Yamagishi, T., Mifune, N., Li, Y., Shinada, M., Hashimoto, H., Horita, Y., . . . Takagishi, H. (2013). Is behavioral pro-sociality game-specific? Pro-social preference and expectations of pro-sociality. *Organizational Behavior and Human Decision Processes, 120,* 260–271. http://dx.doi.org/10.1016/j.obhdp.2012.06.002