Personality and Positionality

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Abstract

This paper employs survey experiments to examine the relationship between personality characteristics and positional concerns across a wide range of "goods," e.g., income and market value of a car, and "bads," e.g., infant mortality and poverty rates. Personality characteristics are measured using the five-factor model (Big-5), the locus of control, and the reciprocity. We demonstrate that there are significant relationships between personality types and positional concerns, which differ both by the type of personality and by the nature of a good. The results are highly consistent with the predictions presented in the field of personality psychology. That is, while agreeableness is negatively associated, conscientiousness, neuroticism, and external locus of control are positively associated with positional concerns for most goods. Importantly, there is also a substantial heterogeneity in the mean degree of positional concerns across the low and high values of most personality characteristics and goods.

Key Words: Personality Characteristics, Survey Experiments, Positional Concerns.
JEL Codes: C90; D63.

1. Introduction

Research in social psychology and more recently in mainstream economics has yielded a bulk of evidence that personality characteristics are significantly correlated with a wide range of individual preferences and outcomes (e.g., Barrick and Mount, 1991; McCrae and Costa, 1999; Borghans et al., 2008). Economists seem to agree that the dimensions of personality can be used as a proxy for the innate abilities, or "non-cognitive" skills, e.g., memory, empathy, attention, imagination, and social skills (Almlund et al., 2011). Non-cognitive skills have been shown to be correlated with outcomes including productivity, earnings, and wages (Osborne, 2005; Nyhus and Pons, 2005; Hackman et al., 2006; Mueller, G. and E. Plug, 2006; Heineck and Anger, 2010; Uysal et al., 2011), job performance and job satisfaction (Barrick and Mount, 1991; Tett et al., 1991; Van den Berg and Feij, 1993; Judge et al., 2002), workplace deviance (Salgado, 2002), leadership and academic/career success (Judge et al., 1999; 2002), unemployment dynamics (Cuesta and Budría, 2012), well-being (DeNeve and Cooper, 1998) as well as several preference parameters, i.e., time preferences, risk aversion, altruism, and social preferences, which play a crucial role in economics (Borghans et al., 2008; Backer et al., 2012).

One important issue is how personality characteristics are related to positional concerns ("status" or "relative" concerns), i.e., that people's utility is affected not only by their own level of consumption but also by their consumption level relative to that of comparable others (e.g., Solnick and Hemenway, 2005; Ferrer-i-Carbonell, 2005; Clark et al., 2008; Carlsson et al., 2007; Akay et al., 2013). The literature on positional concerns, which uses both experimental and life-satisfaction survey datasets, has been growing and several studies demonstrate that positional concerns are strongly related to people's utility in a varying degree across types of goods (Solnick and Hemenway, 2005), levels of economic development and growth (Easterlin, 1995; Senik, 2004), and people's observed characteristics (Akay and Martinsson, 2018).[1] The literature has already identified

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[1]There is a rapidly developing literature on positional concerns. The literature mostly uses either subjective well-being measures, e.g., life satisfaction or happiness, or stated preferences methods to identify the direct utility effect of positional concerns (e.g., Alpizar et al., 2005; Clark et al., 2008). A bulk of the papers suggests that the positional concerns - measured using "relative income" or income "rank" on subjective well-being - negatively influence well-being especially in developed countries (Clark et al., 2008). There is a substantial heterogeneity in positional concerns across the development level of countries. The positional concerns seem to be lower among countries which are poor (e.g., Akay et al., 2011). In line with the

important implications of these concerns in relation to a wide range of economic issues spanning from labor supply (Neumark and Postlewaite, 1998) to migration (Akay et al., 2017) and how to optimize taxation to alleviate the negative impact of positional concerns on people's utility (Aronsson and Johansson-Stenmann, 2014).

However, how positional concerns are related to people's "hard-wired" characteristics such as personality characteristics, genetics, or physiology remains largely unknown. Recently, using panels of subjectively reported well-being datasets and fixed-effects model specifications, Budria and Ferrer-i-Carbonell (2018) and Cuesta and Budria (2015) reported that the influence of relative income position, proxied using income "ranks" within the income distributions of people's reference groups, on subjective well-being, i.e., life-satisfaction, varies greatly depending on the respective person's specific personality traits. The current paper contributes to this limited literature in two aspects: First, we investigate the relationship between personality characteristics and positional concerns using tailored stated choice experiments. One important advantage of this approach is that it identifies the direct utility effect of personality on the degree of positional behavior, which might not be easy to capture with the subjective well-being data. Second, we investigate the relationship between personality and positionality not only for income comparisons but also for comparisons with respect to a wide range of an alternative set of goods.

To ensure comparability with the existing literature, our baseline good is *income/month after tax*, and we use the Big-5 personality traits (*extraversion*, *agreeableness*, *conscientiousness*, *neuroticism*, *openness-to-experience*), *internal/external locus of control* (ILOC and ELOC hereafter), and *positive/negative reciprocity* (PR and NR hereafter) as personality characteristics (e.g., Budria and Ferrer-i-Carbonell, 2018).[2] The stated choice experiment is then extended to allow an alternative set of goods that are also expected to be consumed in different levels by personality types. Second, we experiment on *the market value of a luxury car*, which might be considered an "inherently" positional

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subjective well-being approach, the stated preference methods suggest that people have positional preferences with respect to not only income but also other goods such as the consumption value of a car or vacation days (e.g., Alpizar et al., 2005).

[2]The inventories presented in Appendix B are obtained from the questionnaire used in the 2009 wave of the German Socio-Economic Panel (see www.diw.de for the questionnaires and detailed information).

good. Third, we experiment with a public good using *overall health expenditures in a country*. In the paper, we refer to these first three items as "goods" as they involve positive and desirable elements. The experiment is then extended to include "bads" involving disutility and undesirable aspects including an item relating to leisure-work balance, *working hours/week*, and two public "bads" as *infant mortality rates (per 1000)*, and *poverty rates (%)*.

We present highly robust findings that are consistent with the existing literature using both life-satisfaction (e.g., Budria and Ferrer-i-Carbonell, 2018) and experiment data (e.g., Van der Zee et al., 1996, 1998). First of all, most personality characteristics are significantly related to positional concerns. Among Big-5 personality characteristics, we find strong evidence that agreeableness, conscientiousness, and neuroticism are significantly related to positionality. More specifically, agreeableness is negatively related to positionality while conscientiousness and neuroticism are positively related. There is a significant negative relationship between extraversion and positional concerns only for "bads." There is no particularly strong relationship between openness-to-experience and positional concerns. While ILOC is weakly related to positionality, a significant positive relationship is found for ELOC, which is also highly consistent with the literature. We find a negative and significant relationship between PR and positional concerns only for the "bads." We also conduct an extensive heterogeneity analysis that involves both parametric and non-parametric methods to unveil how positional concerns vary across levels of personality characteristics. One important result is that positional concerns are strong and statistically significantly different from the overall mean level of positionality mostly among people who score lower on each personality trait. For people with medium-to-high levels of most personality characteristics, the degree of positionality is about the same as the overall mean level of positionality.

The remainder of the paper is organized as follows. The next section presents the experiment setup, personality measures and hypotheses, and gives a summary of the experiment. Section 3 explains the econometric approaches and estimators used. Section 4 presents the main results of the experiment, a robustness analysis, and an extensive heterogeneity analysis based on parametric and non-parametric models. Finally, Section 5 concludes the paper.

2. The Experiment

The survey experiment was conducted in a large lecture hall at Istanbul University in 2014 using 307 undergraduate students in the disciplines of economics, psychology, and law.[3] Experimental assistants explained the experiment to the respondents at the beginning of the session. The experiment consisted of two parts. First, the respondents answered a series of hypothetical stated choice questions. We used these responses to identify their degree of positional concerns. In the second part, the respondents were given a follow-up questionnaire, the responses to which we used to elicit several individual socio-demographic and socio-economic characteristics, personality measures as well as other data concerning the respondents' attitudes, emotions, and feelings. At the end of the experiment, the participants received a pocket book, the value of which equaled the average labor market value of the time spent completing the experiment.

2.1. Identification of Positionality

Preferences. The main objective of the experiment is to identify how degree of positional concern is related to personality characteristics for alternative sets of goods. To be able to measure the degree of positional concern, we specify a utility function $U^g(Y^g, Y^g - Y^{gR})$ that is additive in relative $Y^g - Y^{gR}$ and absolute Y^g consumption levels of each good g (e.g., Akerlof, 1997; Knell, 1999):

$$U^g(Y^g, Y^g - Y^{gR}) = (1 - \theta^g)Y^g + \theta^g(Y^g - Y^{gR}), \tag{1}$$

where θ^g is the parameter measuring the *marginal degree of positional concern*, i.e., the fraction of the marginal utility that is due to the increase in relative consumption of good g. Equation (1) assumes that people compare their consumption level of a good with a reference (or comparison) consumption level Y^{gR} of their reference group, e.g., others in their society. In order to investigate the relationship between personality and positional

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[3]According to the Turkish law, the experiment did not require an ethical committee approval and there was no institutional review board for the social sciences in the Istanbul University by the time of our experiment, 2014.

concern, an individual-specific measure for the marginal degree of positional concerns θ_i^g should be identified. To this end, we tailored an experiment involving binary choices between two societies that differed in terms of absolute and relative consumption levels. The levels of consumption of each good were specifically selected from the indifference curves of utility function (1) for a set of degree positionality θ^g for each good g.

Setup. In the first step of the experiment, the respondents were asked to make a series of decisions regarding where their imaginary grandchild should live given a certain hypothetical scenario (Carlsson and Martinsson, 2001; Johansson-Stenman et al., 2002; Akay et al., 2013).[4] More specifically, the respondents were asked to choose one of two societies for their future grandchild, i.e., Societies (A) and (B), which only differ in terms of their absolute and relative amount of consumption of each good. The scenario and an example choice situation (in Figure 1) were carefully described to the respondents just before the experiment started. The respondents were specifically informed that the prices and consumption levels of all other goods were identical in the two hypothetical societies (see Figure 1).

Having the scenario presented, an example choice situation, which is very similar to choices that respondents are going to make, is carefully described to respondents by experimental assistants. The choice situation used as an example reads as follows: In Society (A), the respondent's hypothetical future grandchild's monthly after-tax income is TRY 2,000, while the average monthly after-tax income amounts to TRY 2,500.[5] In Society (B), the future grandchild's monthly after-tax income is TRY 1,800, while the average monthly after-tax income in this society is TRY 1,500. Thus, the future grandchild would be TRY 200/month richer in Society (A) than in Society (B) *in absolute terms*, yet would earn TRY $2,000 - 2,500 = 500$ *less* per month than the average income earned by other people in society. That is, despite having less money, the future grandchild would be *better off in relative terms* in Society (B), as the grandchild would enjoy TRY $1,800 - 1,500 = 300$ *more* in monthly income than the average person in that society. In effect, by choosing

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[4]The hypothetical choice situation used in our experiment concerned an imaginary future relative and not the respondents themselves. The idea behind this is to increase the respondents' degree of reflection on their hypothetical decisions to make the decision more realistic to decrease potential hypothetical bias (see, e.g., Alpizar et al., 2005, and Carlsson and Martinsson, 2001, for a comprehensive discussion).

[5]TRY 1 equaled about USD 0.31 at the time of the experiment.

Figure 1. The Scenario and Example Choice Situation

In this part of the questionnaire we require you to choose which society you consider to be the best one for an imaginary person living two generations into the future. You can, for example, imagine a grandchild, great grandchild or another relative that you are choosing for. By 'best' we mean the society in which your future relative will be most content.

- The difference between the societies is the income level or the amount of consumption for a certain good of your future relative, and the average income and consumption of the society.
- The variety of goods and their prices are the same for both societies. For 100 TRY you can buy the same goods and the same amount in both societies. Prices are expressed in today's price level.

- It is important that you focus your answer on what is in the best interest of the imagined person, and nothing else. There is no "correct" response to these questions and we ask you to reflect on the choices carefully.

Example: In the example below your future relative earns 200 TRY/month more in society A compared with society B. You can also see that your future relative earns 500 TRY/month less than the average income in society A and 300 TRY/month more than the average in society B.

Society A: – Your relative's income is 2,000 TRY/month after tax
  – The average income in society is 2,500 TRY/month after tax
Society B: – Your relative's income 1,800 TRY/month after tax
  – The average income in society is 1,500 TRY/month after tax

We require you to choose which society you consider to be the best one for your future relative; that is, the society in which your future relative will be most content. It is important that you focus your answer solely on this; that is: which society is the best for your future relative? You should not consider which society is best on

Society (B), respondents stated a particular degree of positional concern which is implicit in the assigned income levels.

In our survey experiment, respondents are asked to make repeated binary choices that vary in *implicit* degree of positional concerns. What we mean by "implicit" is that we select specific consumption levels of each good so that the distance between absolute and relative amounts in two societies corresponds to a particular degree of positionality θ in each choice situation.[6] The logic of the design can be described as follows: If a respondent is indifferent between living in Society (A) and Society (B), then the respondent implies that $U\left(Y_A^g, Y_A^g - Y_A^{gR}\right) = U\left(Y_B^g, Y_B^g - Y_B^{gR}\right)$ for a good g (after-tax income/month in this case).

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[6]To be realistic, the levels of consumption of each good are specifically determined by considering the actual life conditions of our respondents. We apply alternative strategies to determine the hypothetical levels of consumption of each good. For income, we simply use the average per capita income level in Turkey at the time of the experiment. The market value of a car is determined by calculating the average price of top-selling cars in the country. Weakly working hours is referenced to full time. We aimed to use realistic levels for the infant mortality and poverty rates considering the levels realized in Turkey and in other countries at the time of the experiment.

In the case of utility function (1), we can write $Y_A^g - \theta^g Y_A^{gR} = Y_B^g - \theta^g Y_B^{gR}$ and the marginal degree of positional concerns is $\theta^g = Y_A^g - Y_B^g / Y_A^{gR} - Y_B^{gR}$. In the example choice situation, if the respondent chooses to live in Society (A), then the marginal degree of positional concern is $\theta^g = 2{,}000 - 1{,}800 / 2{,}500 - 1{,}500 = .20$, implying that the respondent's degree of positionality is at least .20 ($\theta^g > .20$) for after-tax income/month. That is, the design cannot identify the exact degree of positional concerns of respondents. However, we can observe the level of positionality in intervals by asking repeated questions with varying implicit degree of positional concerns. In the experiment, the respondents were asked to answer three sequential questions for each good and their answers provide information for the upper and lower bound of positionality in intervals $\theta^g \leq .25$, $.25 < \theta^g \leq .50$, $.50 < \theta^g \leq .75$, $\theta^g > .75$, which are implicit in the consumption levels assigned for each good (see Appendix A for three choice situations for income). Using the stated preferences of respondents for each good, we then aim to estimate the mean level of θ^g for each good g in relation to the personality characteristics of respondents.

Summary of the Experiment. The survey experiment included six goods which differ in several aspects. The experiment is summarized in Table 1, where we present own and others' consumption levels for each good and the share of respondents who chose the positional alternative for each choice situation. The first and second columns show the imaginary grandchild's level of consumption and the consumption level of other people, respectively. For each good, we determined a Society (A) and three (B) societies, i.e., B(1), B(2), and B(3), for which the consumption levels were chosen to correspond to an increasing implicit marginal degree of positionality (.25, .50, and .75) for each good (third column).[7]

The raw shares of respondents who chose the positional alternative in the respective choice situations are given in the fourth column. The overall raw mean shares of respondents who chose Society (B) across three choice situations for each good are given in bold. The raw mean shares of positional choice are heterogeneous across goods. The share is .52 for income, and the respondents showed the lowest positional concerns for working hours/

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[7] Note that there are tiny variations in the implicit marginal degree of positional concerns. This is due to the rounding of each goods to a reasonable unit to approximate 0.25, 0.50, and 0.75.

Table 1. Summary of the Experiment

	Own Level of Consumption	Average Level of Others' Consumption	Assigned Implicit Degree of Positionality	Share who chose positional alternative	Share of respondents who answered inconsistently	Sample size after excluding inconsistent respondents
Income/Month after tax(TRY)				**0.521**	0.117	271
Society A	**2,000**	**2,200**				
Society B(1)	1,800	1,400	0.250	0.612		
Society B(2)	1,550	1,300	0.500	0.520		
Society B(3)	1,220	1,160	0.750	0.432		
Market Value of a Car (TRY)				**0.558**	0.166	257
Society A	**30,000**	**33,000**				
Society B(1)	28,000	25,036	0.250	0.642		
Society B(2)	25,000	22,904	0.500	0.576		
Society B(3)	22,000	21,829	0.750	0.457		
Health Expenditure (Billion TRY)				**0.553**	0.088	280
Society A	**130**	**142**				
Society B(1)B24:H48	118	94	0.250	0.617		
Society B(2)	102	86	0.500	0.570		
Society B(3)	85	82	0.750	0.471		
Working Hours/Week (Hours)				**0.386**	0.094	279
Society A	**40**	**36**				
Society B(1)	42.5	46	0.250	0.501		
Society B(2)	47	51	0.500	0.363		
Society B(3)	61	64	0.750	0.295		
Infant Mortality Rate (Per 1000)				**0.414**	0.075	284
Society A	**12.0**	**10.6**				
Society B(1)	13.2	15.4	0.250	0.503		
Society B(2)	14.8	16.2	0.500	0.401		
Society B(3)	16.8	17.0	0.750	0.338		
Poverty Rate (%)				**0.451**	0.085	281
Society A	**6.0**	**4.5**				
Society B(1)	6.7	7.3	0.250	0.555		
Society B(2)	8.0	8.5	0.500	0.484		
Society B(3)	9.2	9.5	0.750	0.399		
Overall Mean Share of Positional Choice				**0.483**		

Notes: Own calculations from the experimental data.

week, at .39, and the highest for the market value of a car, at .56. One expected result is that the shares of respondents who chose the positional alternative fall when the implicit degree of positionality is higher. Raw results suggest that the mean share of positional choice tends to be lower (.42) for the "bads" involving disutility (working hours/week) and suffering (infant mortality rates (per 1000) and poverty rates (%)) than for the "goods" (.55) (after tax income/month, market value of a car, and overall health expenditures). Mann-Whitney-U test suggests that the difference is highly statistically significant (p-value < .001). The overall raw mean share of positional choice across all choice situations and goods is .48. This value is highly similar to the findings in previous studies using similar

samples and methods (Johansson-Stenman et al., 2002; Alpizar et al., 2005; Carlsson et al., 2007; Akay et al., 2013).[8]

One important remark is that we assume our respondents are utility-maximizing agents and as such should comply with the standard assumptions of utility-maximizing behavior. However, in reality, some respondents may act inconsistently by switching back and forth between societies and violates the transitivity assumption, e.g., choosing Society (A) at the first-choice situation and then choosing Society (B) in the second- of third-choice situation. We identify all inconsistent respondents for each good and then calculate their share out of all respondents. The results presented in the second to last column of Table 1 suggest that the shares of respondents who responded inconsistently are similar across the goods and vary from 7.5% (infant mortality rate) to 12.6% (market value of a car). We will exclude these respondents from the sample in our empirical analysis. The final sample size is given in the last column of Table 1 for each good.

2.2. Measures of Personality Characteristics

The Big-5 Measure of Personality. The model is one of the widely used taxonomy in the psychology and recently in economics, as it offers an integrative framework to understand individual differences in broader categories (for a comprehensive review see McCrae and Costa, 1997). The measure is based on 15 subjective questions, which are presented in Table B.1 (in Appendix B). The Big-5 personality measure identifies personality in five categories labelled *extraversion*, *agreeableness*, *conscientiousness*, *openness-to-experience*, and *neuroticism* (or emotional stability when reversed). Respondents are asked to provide a response to each question, or statement, in the inventory using a 7-point scale where 1 means "*it does not apply at all*" and 7 "*it applies fully.*" In a next step, Big-5 personality measures are calculated by adding the response scores for the three questions for each personality category and thus, each of the five measures obtained ranges from 3 to 21 (please see Table B.1 for the calculation of Big-5 personality characteristics). Each

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[8]This result is well in line with previous findings in the literature. Using a similar sample and an experiment conducted in Turkey, Istanbul, Akay et al. (2013) find a mean share of positional choice of about .40. The degree of positional behavior observed in these sorts of stated choice experiments differs across countries, ranging from .10–.20 (e.g.., Ethiopia, Akay et al., 2011) to .70–.80 (e.g.., Sweden, Johannson-Stenman et al., 2002).

individual has a specific combination of the five mutually non-exhaustive characteristics, and each Big-5 personality characteristic is expected to be associated with specific attitudes and types of behavior.

A priori predictions about how Big-5 personality types relate to positional behavior might be difficult and the degree of correlation might also differ across the levels of each personality type and also on the type of good under consideration. Using information from the field of personality psychology, we suggest a series of hypothesis regarding the relationship between personality and positional concerns as follows. A high score on extraversion is associated with a higher frequency social interactions and ambition, which in turn may be correlated with a higher positional concern. Indeed, evidence shows that extraverts value their status at work, for instance (Barrick et al., 2002; Landis and Gladstone, 2017). Thus, the relationship between extraversion and positional behavior is expected to be positive. However, we note that these individuals are also friendly, seeking friendship, and sympathetic with others' gains and losses, which might correlate negatively with positional concerns. That is, while extraverts might enjoy a status reward of having a higher position, they might also be sympathetic to the circumstances of comparable others, e.g., friends. Thus, the relationship between extraversion and positional concerns might be masked depending on the weights of these counteracting dimensions of extraversion.

A high score on agreeableness is associated with cooperative behavior and altruism, which might be associated with weaker positional concerns (McCrae and Costa, 1999). These individuals are highly motivated for work and tend to avoid conflict with others and display less workplace deviation, which might also be related to lower levels of positional concerns, especially with respect to working hours (Salgado, 2002; Graziano and Tobin, 2002). Yet at the lower end of agreeableness, the positional behavior might look substantially different. Individuals scoring low on agreeableness might exhibit "spiteful" behavior and may tend to punish others if they perceive their status as a threat, which in turn may go hand in hand with stronger positional concerns (Marcus et al., 2014). Conscientiousness relates to hard work, work ethics, self-discipline, competition, and a higher degree of goal-oriented behavior. A higher score on this factor relates to welfare positively and these individuals are more reactive to changes in their income and the

behavior of others (Boyce and Wood, 2011). Thus, a high level of conscientiousness might be associated with a higher level of positional concerns.

Neuroticism is associated with negative emotions, depression, and lower levels of life satisfaction. A higher score in this area is expected to be positively correlated with positionality as these individuals seek (mostly downward) comparisons to enhance their mood (Van der Zee et al., 1996; 1998; Buunk et al., 2002). Finally, openness-to-experience is associated with diverse social interactions, valuing arts, and a tendency to socialize with people who represent different values and cultures. While a higher score on the openness-to-experience might be positively related to positional concern, as it would in the case of extraversion, this personality trait might lead to less positional behavior if these individuals use the information gained from the experiences and interaction with others to improve their status in the future (as in the case of "tunnel effect" of Hirschman and Rothschild, 1973). Thus, the direction of the relationship is unknown a priori.

Internal and External Locus of Control. This model of personality aims to measure internal and external aspects of the degree of autonomy in the life decisions and actions of individuals (Rotter, 1966). That is, it measures the degree to which individuals believe that they can control their own life decisions and the outcomes they lead to. There are two dimensions called *internal* and *external* locus of control, i.e., ILOC and ELOC. ILOC is a measure of the belief that an individual has control over one's decisions and their outcomes. ELOC is a measure of how much individuals believe that external forces, e.g., other people, society, luck, or fate, determine their life outcomes. To measure ILOC and ELOC, we use Rotter's (1966) inventory, which is based on the ten questions, or statements, presented in Table B.2 (in Appendix B). Respondents are expected to respond to each question using a 7-point scale (1 = "*it does not apply at all*" and 7 = "*it applies fully*"). ILOC is measured as the sum of the response scores for questions Q1, Q6, and Q9, and can therefore range from 3 to 21. ELOC is measured by adding up the response scores for the remaining seven questions and can therefore range from 7 to 49.

There is substantial evidence that a higher ILOC score is positively correlated with career success, job performance, and income among many other outcomes (e.g., Caliendo et al., 2014; Buddelmeyer and Powdthavee, 2016; Andrisani, 1981; Strauser et al., 2002; McGee

and McGee, 2016; Heineck and Anger, 2010; Piatek and Pinger, 2010; and see Cobb-Clark, 2015 for a comprehensive discussion).[9] While these individuals are expected to display weaker positional concerns, as they are successful in general and do not depend on others' behavior, they might also experience stronger positional concerns as they regularly set higher goals to challenge them (Cobb-Clark, 2015). For instance, it is possible that higher consumption levels among others might be a pushing factor for people with higher ILOC scores. Thus, no a priori prediction can be made regarding the direction of the relationship between ILOC scores and degree of positionality. However, though not symmetrically, a higher ELOC score might be related to a dependency on others' behavior (Cobb-Clark and Schurer, 2013). Thus, individuals with high ELOC scores might engage in a high degree of comparisons with other people's consumption levels.

Positive and Negative Reciprocity. *Reciprocity* has to do with how a person responds to another person's behavior (Falk and Fischbacher, 2006; Dohmen et al., 2009; Caliendo et al., 2014; Budria and Ferrer-i-Carbonell, 2018). That is, it has to do with the degree to which a person tends to respond with kindness to kind behavior and unkindly to unkind behavior. Literature suggests that there are differences in the degree of responses to kind and mean behavior, and these differences are measured on two subscales for *positive* and *negative* reciprocity (PR and NR), respectively. The reciprocity inventory is presented in Table B.3 (in Appendix B). It is based on six questions, or statements. To calculate a person's PR score, we sum up the responses to questions Q1, Q4, and Q6, and we do the same thing with the responses to the remaining questions to calculate the person's NR measure. This aspect of a person's personality is also measured using a 7-point scale, and a person's total PR and NR scores can range from 3 to 21.

The reactions of individuals to other people's behavior and attitudes are expected to differ based on how they perceive their and others' position and depending on the type of good. Higher PR scores are associated with higher levels of cooperation, which may imply less

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[9]A general finding is that the internal locus of control is associated with positive outcomes including more human capital accumulation and educational attainment (Piatek and Pinger, 2015), better earning returns (Osborne, 2005), upward wage mobility (Schnitzlein and Stephani, 2013), more efficient job searching (Caliendo et al., 2015; McGee, 2014), a higher probability of entrepreneurship (Caliendo et al., 2014), and better personal health (Cobb-Clark et al., 2014).

concern about one's relative consumption level. In contrast, people with high NR scores might display lower levels of cooperative behavior, trust and also well-being (Dohmen et al., 2009; Budria and Ferrer-i-Carbonell, 2018). They are also expected to be more positional in nature, especially if they perceive higher positions of others as a "threat" that might lead them to retaliate with a more positionally oriented behavior, in particular for inherently status goods.

3. Econometric Specifications

The Model. The repeated nature of our experimental setup allows us to identify the degree of positionality θ^g in intervals $(-\infty < \mu_1], (\mu_1, \mu_2], \ldots, [\mu_V, \infty)$ for each repeated choice situation or version $v = 1, \ldots, V$ for each good g. In our case, $V = 3$ and the interval boundaries are a priori known, $\mu_1 = .25$, $\mu_2 = .50$, $\mu_3 = .75$, while the global lower and upper boundaries of positionality intervals are set to be censored. To be able to estimate the mean degree of positional concerns conditional on personality characteristics, we specify the following model:

$$\tilde{\theta}_i^g = \mathbf{X}'\beta + \alpha IA_i + \mathbf{\Pi}'_p\lambda^p + \epsilon_i^g, \tag{2}$$

where $\tilde{\theta}_i^g$ is the latent (marginal) degree of positional concern with respect to good g for each individual i. $\mathbf{X}$ is a matrix containing a set of control variables consisting of age, gender, household income (seven category dummies), household size, number of siblings, health-status (four dummies), university department enrolled at (dummies for economics, psychology, and law), and dummies for each good depending on the specification. β is the corresponding vector of parameters to be estimated. The model also includes a subjective measure of attitude to inequality IA_i, i.e., subjective inequality aversion, to alleviate the potential bias due to omitted variables and α is the parameter to be estimated.[10] The model specification in equation (2) controls for personality characteristics in $\mathbf{\Pi}$, in separate

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[10]To measure subjective inequality aversion, we asked the respondents to rate their opinions regarding inequality on two 7-point scales, one ranging from "*income should be more equal as incentive*" (1) to "*we need larger income differences for higher effort*" (7) and the other from "*an egalitarian society where the gap between rich and poor is small, regardless of achievement*" (1) to "*a society, where wealth is distributed according to ones' achievement*" (7). To construct the scale, we simply sum response scores from these two questions and include in our baseline model specification.

regressions for Big-5 traits, locus of control, and reciprocity. To allow for some flexibility on the relationship between personality and positional concerns, we use log-transformed personality characteristics for each type. λ^p is the corresponding vector for each personality measure p. Finally, ϵ_i^g is the usual error term, which is assumed to be normally distributed.

Estimators. The model specification in (2) is an interval regression in which we use the marginal interval of positionality as dependent variable for each individual. Using the normal distribution assumption, the probability that a respondent's degree of positionality is in a particular positionality interval is

$$\Pr\left(\mu_1 < \tilde{\theta} \leq \mu_{v+1}\right) = \Phi(\mu_{v+1}|\mathbf{X}, \beta, \lambda) - \Phi(\mu_v|\mathbf{X}, \beta, \lambda), \tag{3}$$

where $\Phi(.)$ is the standard normal distribution function. The likelihood function for the uncensored observations is:

$$\ln(\mathcal{L}(\beta|\mathbf{X}) = \sum_{i=1}^{N}\sum_{v=1}^{V=3} \delta_{i,v}\ln[\Phi(\mu_{v+1}|\mathbf{X}, \beta, \lambda) - \Phi(\mu_v|\mathbf{X}, \beta, \lambda)], \tag{4}$$

where $\delta_{i,v}$ is a dummy variable indicating the positional choice of individual i for the experimental version v. The global lower and upper bounds can also be chosen arbitrarily or set to be censored below zero and above one. In our baseline model specification (2), we consider them as censored. Yet we also compare estimation results with the neutral choice as 0 for the lower boundary of the first and 1 for the upper boundary of the last interval. Then, by calibrating the likelihood function (4) for the censored observations, the estimates of β and λ can be obtained by maximizing (4).

The model specification in equation (2) is also estimated with alternative model specifications to investigate the robustness of the results. First, an ordered probit model, which maps the marginal positionality intervals on an increasing ordinal sequence and allows unknown cut-off points for the positionality intervals, is estimated. Second, binary choice models are estimated by assuming that an individual makes binary decisions in each choice situation. Third, the repeated nature of the experimental data is exploited to allow for the unobserved individuals effects in the model specifications. A panel dataset is defined over the respondents and repeated choices (as time dimension of the panel data)

and panel data (Mundlak type) correlated random-effects models are estimated based on alternative auxiliary functions of unobserved individual heterogeneity. The characteristics used in the auxiliary distributions are well-being (e.g., positive and negative moods, feelings and happiness), emotions (e.g., envy) and self-esteem among others. Detailed results from using alternative estimators will be presented in our robustness analysis. Finally, a non-parametric estimator, i.e., Spearman-Karber, which is robust to violation of parametric assumptions and sample size, will also be employed when we predict the mean degree of positionality in relation to low and high levels of each personality trait.

4. Results

When presenting our empirical results, we first look at the results obtained by combining all goods and then we present the heterogeneity in the positional concerns for "goods" and "bads," and also for each good separately. Second, we present the results from our robustness checks focusing on model specifications, confounding factors, and experimental biases. Finally, we conduct an extensive heterogeneity analysis to investigate how mean degree of positional concern vary across the levels of each personality trait.

4.1. How do Personality Characteristics Relate to Positional Behavior?

Main Results. We first focus on the sign and significance of personality characteristics on the marginal degree of positional concern. For reasons of brevity, the tables present results only for personality measures.[11] First, we merge the experimental data obtained from all experimented goods in one dataset and estimate equation (2). In this model specification, the dependent variable is the lower and upper boundary value of the marginal positionality interval for each individual over all goods. Having deleted the inconsistent respondents and missing information, the total sample consists of 1,544 respondent-good observations. The main estimation results of the relationship between personality and positionality for all goods combined are given in Column I of Table 2. First of all, among the Big-5 personality

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[11]The results of other control variables are highly consistent with the previous literature. Female, less healthy, and relatively poor respondents show weaker positional concern. The subjective measure of inequality aversion is negatively and significantly related to positional concerns, as expected. The full estimation results can be obtained from the authors.

characteristics, agreeableness, conscientiousness, and neuroticism are significantly related to positionality after controlling for socio-demographic characteristics, inequality aversion, and indicators for goods. Also, the signs of the estimated parameters are well in line with the predictions discussed above and those in the literature (e.g., Budria and Ferrer-i-Carbonell, 2018). Agreeableness is negatively associated with positionality, while

Table 2. Main Results

	All Goods "Combined"	Only "Goods"	Only "Bads"	Consistency with Predictions	
	I	II	III	IV	
Big-5 Personality Characteristics				(a)	(b)
Extraversion	-0.0401	0.0251	-0.1048 **	+	x
	(0.0321)	(0.0459)	(0.0441)		
Agreeableness	-0.0901 ***	-0.0566	-0.1163 ***	–	o
	(0.0343)	(0.0515)	(0.0445)		
Conscientiousness	0.1574 ***	0.1083 **	0.2058 ***	+	o
	(0.0358)	(0.0505)	(0.0491)		
Neuroticism	0.0989 ***	0.1375 ***	0.0646 **	+	o
	(0.0217)	(0.0315)	(0.0289)		
Openness to Experience	-0.0085	-0.0316	0.0099	~	o
	(0.0326)	(0.0476)	(0.0433)		
Locus of Control					
Internal (ILOC)	0.0474	0.0236	0.0698	~	o
	(0.0400)	(0.0579)	(0.0538)		
External (ELOC)	0.1107 ***	0.1384 ***	0.0821 *	+	o
	(0.0322)	(0.0474)	(0.0436)		
Reciprocity					
Negative (NR)	0.0228	0.0348	0.0099	+	x(p)
	(0.0169)	(0.0245)	(0.0231)		
Positive (PR)	-0.0308	0.0354	-0.0934 **	–	o(p)
	(0.0327)	(0.0454)	(0.0448)		
#Observations	1,544	756	788		

Note: Author's own calculations from the experimental data.
The model specifications control for age, gender, household size, a dummy for whether living with
Robust standard errors are presented in the parentheses.
*, **, and *** indicate significance level at 10%, 5%, and 1% levels of significance, respectively.

conscientiousness and neuroticism are positively related. The sign of extraversion and openness-to-experience is negative but they are not statistically significant on positional concerns. The results for ILOC and ELOC are presented in the second block of Table 2, Column I. Both variables are positively related to positional concerns, yet only ELOC is statistically significant, in line with our predictions and the literature. In the final block, we present the results for PR and NR. The negative sign of the estimated parameter of PR and

the positive sign of the estimated parameter of NR are also consistent with the predictions. On average, there is no significant relationship between reciprocity and positional behavior when we combine all goods.

Do the Results Differ between "Goods" and "Bads"? We will now investigate the heterogeneity on the relationship between personal concerns and positionality by some characteristics of goods. To this end, before presenting, we combine the data from after-tax income/month, market value of a car, and overall health expenditures experiments as "goods," and the remaining three items, working hours/week, poverty and infant mortality rates, as "bads." Columns II and III present results for the "goods" and "bads" obtained from the baseline model specification (2). These results are highly consistent with those in Column I, with some exceptions. The parameter estimates of conscientiousness, neuroticism, and ELOC have the same sign and significance levels as in the baseline figures in Column I. Other than that, there are some important differences between the columns that should be highlighted. First, positional concerns of extraverts react differently to "goods" and "bads." These individuals exhibit significantly lower positional concerns regarding "bads" than "goods", possibly because of their higher levels of friendliness and sympathy. A higher score on agreeableness is significantly associated with positional concerns only for "bads." Conscientious individuals are also slightly more positional regarding the "bads" (.11 vs. .21), yet this difference is not statistically significant (p-value = .125), on average. People with a high conscientiousness score might desire and believe they deserve to live in a better society given their high level of work effort and discipline. In contrast, people with a high neuroticism score are more positional regarding "goods" than "bads" (.14 vs. .07) with a statistically significant difference (p-value = .067). Finally, people with high PR scores show significantly lower positional concern (p-value = .047) regarding "bads," possibly because of the high degree of empathy and cooperative behavior demonstrated by people in this personality.

Is the Evidence Consistent with Predictions? The results so far indicate highly significant relationships between various personality characteristics and positional concerns. In Columns IV (a) and (b) of Table 2, we summarize our predictions about the relationship between specific personality characteristics and positional concern (a) and whether our results are consistent with the predictions (b). Column IV (a) uses the symbols

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(-), (+), and (~) to characterize expected relationships as negative, positive, and a priori unknown, respectively. Column (b) uses symbols to indicate whether the expected and estimated signs are consistent (o), partially consistent o(p), inconsistent (x) or partially inconsistent x(p). The results suggest that the evidence is highly consistent with our expectations, except for extraversion (inconsistent) and NR (partially inconsistent). As discussed above, extraversion is expected to be positively associated with positionality. Yet, extraverts might also have lower positional concerns as they might be more empathetic to other people's situations. Thus, the negative relationship found for "bads" might be due to the nature of the good considered. NR is expected to be positively related to positional concerns, which is in line with our estimates. However, our estimates are statistically imprecise.

Table 3. Results Across Goods

	Income (TRY/Month)	Market Value of a Car (TRY)	Overall Health Expenditures (Billion TRY)	Working Hours (Week)	Infant Mortality Rate (Per 1000)	Poverty Rate (% of People)
	I	II	III	IV	V	VI
Big-5 Personality Characteristics						
Extraversion	-0.0328	0.0651	0.0456	-0.0151	-0.1284 *	-0.1748 ***
	(0.0853)	(0.0757)	(0.0736)	(0.0795)	(0.0759)	(0.0663)
Agreeableness	0.0067	-0.0271	-0.1405 *	-0.1710 **	-0.0887	-0.0947
	(0.0880)	(0.0895)	(0.0856)	(0.0754)	(0.0791)	(0.0723)
Conscientiousness	0.1323 *	0.1090	0.1921 **	0.1534 **	0.1732 **	0.2966 ***
	(0.0754)	(0.0830)	(0.0817)	(0.0751)	(0.0808)	(0.0869)
Neuroticism	0.0958 *	0.1484 ***	0.1670 ***	0.0433	0.0735	0.0762
	(0.0561)	(0.0498)	(0.0508)	(0.0520)	(0.0465)	(0.0494)
Openness to Experience	-0.0119	-0.0353	-0.0535	0.0443	0.0258	-0.0452
	(0.0895)	(0.0810)	(0.0801)	(0.0689)	(0.0706)	(0.0789)
Locus of Control						
Internal	0.0854	0.0694	-0.0879	0.2453 ***	-0.0747	0.0492
	(0.1042)	(0.0981)	(0.0959)	(0.0825)	(0.0925)	(0.0931)
External	0.0365	0.1677 **	0.2138 ***	0.0462	0.0306	0.1608 **
	(0.0849)	(0.0835)	(0.0769)	(0.0757)	(0.0747)	(0.0753)
Reciprocity Norms						
Negative	-0.0326	0.0751 *	0.0663 *	0.0047	-0.0325	0.0599
	(0.0424)	(0.0428)	(0.0383)	(0.0412)	(0.0361)	(0.0396)
Positive	0.0432	0.1001	-0.0276	-0.0446	-0.1270 *	-0.1042
	(0.0769)	(0.0693)	(0.0743)	(0.0670)	(0.0745)	(0.0791)
#Observations	255	242	266	261	274	274

Note: Author's own calculations from the experimental data.

The model specifications control for age, gender, household size, a dummy for whether living with parents, household income categories (7 categories), department (economics, psychology, and law), health status (4 dummies), inequality aversion, and indicators for goods.

Robust standard errors are presented in the parentheses.

*, **, and *** indicate significance level at 10%, 5%, and 1% levels of significance, respectively.

Personality Traits and Positional Behavior Across Goods. The baseline model specification is estimated for each good in separate regressions. Note that splitting the experimental data by goods has an important disadvantage as it reduces the sample size in each estimation, which may affect the precision of the estimators. Nevertheless, to obtain the heterogeneity of personality on positional concerns across goods, the baseline model specification is estimated using the experimental data which are specific to each good. The heterogeneity results presented in Table 3 unveil important relationships. First, there is a substantial consistency in the signs and magnitudes of parameter estimates across goods compared with the ones presented previously. However, the significance levels show important variations for some personality characteristics and goods as well. Extraverts are significantly less positional when it comes to infant mortality and poverty rates, as reported above. The relationship is slightly stronger for the former. Agreeableness is negatively and statistically significantly related to positionality only for working hours/week and health expenditures. Conscientiousness and neuroticism are the two personality characteristics with the most consistent associations on positional concerns across the evaluated goods. Conscientiousness is positively associated with positionality, and the relationship is statistically significant for almost all goods. Neuroticism is also positive across all goods, but it is statistically significant only for income, market value of a car, and health expenditures. ILOC is significantly and positively related to positionality only for working hours/week, while ELOC is positively associated with positionality for the market value of a car, health expenditures, and poverty rates. NR is also positive and significant on positionality for market value of a car and health status. As previously reported, the parameter estimate of PR is negative and large for "bads". Overall, most results are highly consistent with the predictions discussed above.

4.2. Robustness

Alternative Model Specifications. The model specification chosen for our baseline is an interval regression as we measure positionality in intervals with predetermined borders. One possibility is to interpret the positionality intervals as an ordinal data by assigning increasing ordered numbers for each marginal positionality interval. In this case, the specification in equation (2) is a standard ordered probit model where the borders of marginal positionality intervals are assumed to be unknown cut-off points, μ_v. Using the

baseline sample, which combined the experimental results for all goods in one dataset, an ordered probit model is estimated and the results are presented in Column I of Table 4. Note that the magnitudes of parameter estimates cannot be directly compared with those of the baseline. We compare only signs and significance of estimates. The ordered probit model specification produces the same signs and significance levels for the Big-5 characteristics, ILOC, and ELOC compared to those obtained from the baseline. Yet, this model specification suggests no statistically significant relationship between PR and positional concerns, albeit the sign is the same as in baseline. Among the unreported results, several alternative model specifications have also been estimated. First, we estimated the model with OLS and the results hardly changed. Second, we experimented with the vector of control variables used in the model specification. The results presented in Table 2 turned out to be robust with respect to combinations of control variables used and show hardly any noticeable difference compared with what of the baseline.

Unobserved Heterogeneity and Endogeneity of Personality Traits. As in the bulk of the previous literature, this paper assumes that personality characteristics are relatively stable constructs that do not change significantly over time (Borghans, 2008; Heineck and Anger, 2010; Cobb-Clark and Schurer, 2013). People's personalities have been found to develop before or during adolescence (age 10–19) and then remain stable for a long time.[12] Thus, it is fair to assume that the respondents in our experiment are old enough (ages 18–27) to have completed the development of their personalities (Becker et al., 2012). The assumption that a person's personality is fixed, at least for quite a few years, then allows us to consider personality characteristics as exogenous variables (Cobb-Clark and Schurer, 2013). However, some omitted variables, e.g., self-esteem, emotions, and mood characteristics, may be correlated with personality characteristics and therefore lead to bias in our estimators. To deal with this potential problem, we have already allowed our baseline model specification for the subjective inequality aversion, which is expected to be one of the key potential omitted variables. Yet, allowing the inequality measure in the model does not affect the results substantially.

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[12]The stability of personality characteristics has long been discussed by personality psychologists (Roberts and DelVecchio, 2000; McGue et al., 1993; Costa and McCrae, 1988; 1994; Digman, 1989) and recently also by economists (Cobb-Clark and Schurer, 2013; Boyce et al., 2013). Most studies in the literature report that personality characteristics are relatively stable across the life cycle.

Ideally, to deal with the endogeneity of personality, we would need a panel dataset with a fixed-effect model specification or a proper instrument for personality to identify the causal effects. Unfortunately, though, the experimental setup does not allow us to use either of these approaches. That is, the results presented in this paper are still simple correlations and should be interpreted with caution. However, we can suggest an alternative strategy. First, since our respondents make repeated choices characterized by a gradually increasing marginal degree of positional concern, we can interpret the experimental data as a panel

Table 4. Robustness Checks

	Ordered Probit	Random-Effects	Correlated Random-Effects (1)	Correlated Random-Effects (2)	Correlated Random-Effects Probit	Baseline with Order Effects
	I	II	III	IV	V	VI
Big-5 Personality Characteristics						
Extraversion	-0.1604	-0.0520	-0.0763	-0.1259 *	-0.4530	-0.0406
	(0.1300)	(0.0561)	(0.0637)	(0.0665)	(0.3203)	(0.0322)
Agreeableness	-0.3606 ***	-0.1146	-0.1340 *	-0.1354 *	-0.5559 *	-0.0838 **
	(0.1387)	(0.0703)	(0.0784)	(0.0771)	(0.3366)	(0.0351)
Conscientiousness	0.6300 ***	0.1904 ***	0.1553 **	0.1312 *	0.5540 *	0.1539 ***
	(0.1449)	(0.0707)	(0.0734)	(0.0748)	(0.3299)	(0.0362)
Neuroticism	0.3959 ***	0.1279 ***	0.1201 **	0.1117 **	0.4485 **	0.0985 ***
	(0.0880)	(0.0441)	(0.0495)	(0.0495)	(0.2123)	(0.0220)
Openness to Experience	-0.0339	0.0051	0.0382	0.0695	0.2254	-0.0075
	(0.1317)	(0.0557)	(0.0595)	(0.1131)	(0.3003)	(0.0331)
Locus of Control						
Internal	0.1898	0.0615	0.0572	0.0595	0.0271	0.0269
	(0.1618)	(0.0798)	(0.0820)	(0.0649)	(0.3991)	(0.0407)
External	0.4430 ***	0.1425 **	0.1951 **	0.1995 **	0.9078 **	0.1208 ***
	(0.1303)	(0.0719)	(0.0851)	(0.0949)	(0.3954)	(0.0323)
Reciprocity						
Negative	0.0912	0.0276	0.0290	0.0378	0.1504	0.0163
	(0.0684)	(0.0362)	(0.0376)	(0.0363)	(0.1698)	(0.0170)
Positive	-0.1232	-0.0367	-0.0295	-0.0885	-0.3981	-0.0387
	(0.1320)	(0.0593)	(0.0629)	(0.0633)	(0.3039)	(0.0328)
#Observations	1,544	4,650	4,200	4,065	4,065	1,544

Note: Author's own calculations from the experimental data.

The model specifications control for age, gender, household size, a dummy for whether living with parents, household income categories (7 categories), department (economics, psychology, and law), health status (4 dummies), inequality aversion, and indicators for goods.

Robust standard errors are presented in the parentheses.

*, **, and *** indicate significance level at 10%, 5%, and 1% levels of significance, respectively.

dataset defined over the respondents and repeated choices for each good. Second, we specify a panel data random-effects model with alternative sets of potential "time-invariant" characteristics that could capture unobserved individual characteristics in a Mundlak-type formulation, i.e., a correlated effects model.

In our survey experiment, we elicited several proxy measures that are relatively stable and might be correlated with personality characteristics. The first one is PANAS (Positive and Negative Affects Scale)[13], which aims at measuring positive and negative dimensions of moods and feelings (Watson et al., 1988). Individuals tend to experience positive and negative affects in a relatively stable pattern (Diener and Larsen, 1984) and these affects are found to be correlated with personality characteristics as well (Steel at al., 2008). Second, certain emotions such as envy of other people's success or consumption levels may be correlated with both positional behavior and some personality characteristics, e.g., neuroticism. The approach suggested to measure individual differences in tendency to envy others is based on the Dispositional Envy Scale[14] developed by Smith et al. (1999). Finally, a measure of self-esteem is generated based on the Rosenberg (1985) inventory.[15] The literature identifies important relationships between people's self-esteem, personality, and the degree to which they compare their consumption, appearance, and success with others (e.g., Aspinwall and Taylor, 1993; Suls et al., 2002; Vrabel et al., 2018).

Merging the data for the respondents and their answers for each good generates 4,650 respondents-goods-choice observations. In Column II of Table 4, we first present results from a linear random effects model using the variables controlled for in the baseline. The panel results are highly similar to those for the baseline except when it comes to agreeableness and PR. The parameter estimates of agreeableness are similar to those for the baseline, yet they are not precisely estimated. The estimated parameter of PR is very small compared with that of the baseline, and it is also statistically insignificant. The results of our correlated random-effects panel data model is given in Columns III and IV for two

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[13]The scale is based on 20 questions aimed to measure positive and negative aspects of moods and feelings. More specifically, they measure to what extent individuals experience certain feelings such as attentiveness, happiness, and sadness. See Watson et al. (1988) for the full set of characteristics and details of constructing the measures for the positive and negative affects.

[14]The inventory for the Dispositional Envy Scale is based on eight questions aimed to measure degree to which individuals feel envy (Smith et al., 1999). The inventory asks the respondents about their opinions on some statements (in seven points-scale), for instance, "*I feel envy every day*" or "*Frankly, the success of my neighbors makes me resent them.*" (see Smith et al. (1999) for the full inventory). We sum the answers for each question to construct the Dispositional Envy Scale.

[15]Self-esteem is measured using the Rosenberg (1985) inventory, which includes ten statements. Individuals are asked to report their opinions about the statements on a 4-points-scale. Examples of statements include "*I feel I'm a person of worth, at least on an equal plane with others*" or "*I am able to do things as well as most other people.*" We sum ten questions and form the self-esteem scale.

alternative auxiliary functional forms of the unobserved individual heterogeneity. The correlated effects model given in Column III includes PANAS and the Dispositional Envy Scale. The result differs very little from those for the baseline (Column I of Table 2). Next, we add the self-esteem measure into the auxiliary distribution of the heterogeneity in Column IV. The results are very similar, except for extraversion. In this specification, we find a negative and partially significant relationship between extraversion and positionality. Among the unreported results, we also combined alternative sets of proxy measures in separate correlated-effects models and found highly similar measurements to those in Columns III and IV. In another specification check, we estimated a non-linear correlated effects model using PANAS, the Dispositional Envy Scale, and the self-esteem measure in a random-effects probit model. The parameter estimates (not the marginal effects) are presented in Column V of Table 4. In this model specification, the dependent variable is defined as one if a respondent chooses the positional alternative, and zero otherwise. The results are highly consistent with the baseline and the linear random-effects models presented in the previous columns.

Order Effect. An important concern in the repeated stated choice experiments is the order effect, which might generate bias due to trend in the repeated answers to the binary choice questions. Respondents might get bored or tired, which can lead to bias in the observed preferences depending on the order of the questions asked. To alleviate this potential bias, we a priori design six alternative versions of the same experimental questionnaire where the goods are presented in different orders. Column VI of Table 4 presents results from baseline model specification (2), which includes six order dummies. The results are hardly affected.

4.3. Heterogeneity of Positional Concerns by Levels of Personality Characteristics

The results presented above suggest that several personality measures are significantly related to positional concerns. We now turn our attention to the heterogeneity of predicted mean degree of positionality across the levels of each personality trait. We first investigate how the degree of positional concerns differs from the overall mean degree across the levels of personality characteristics using our baseline parametric model. Then, in a detailed

analysis, a robust non-parametric estimator is exploited to investigate how the mean degree of positionality differs across the low and high values of each personality trait and good.

Figure 2. Patterns of Positionality by Personality Trait
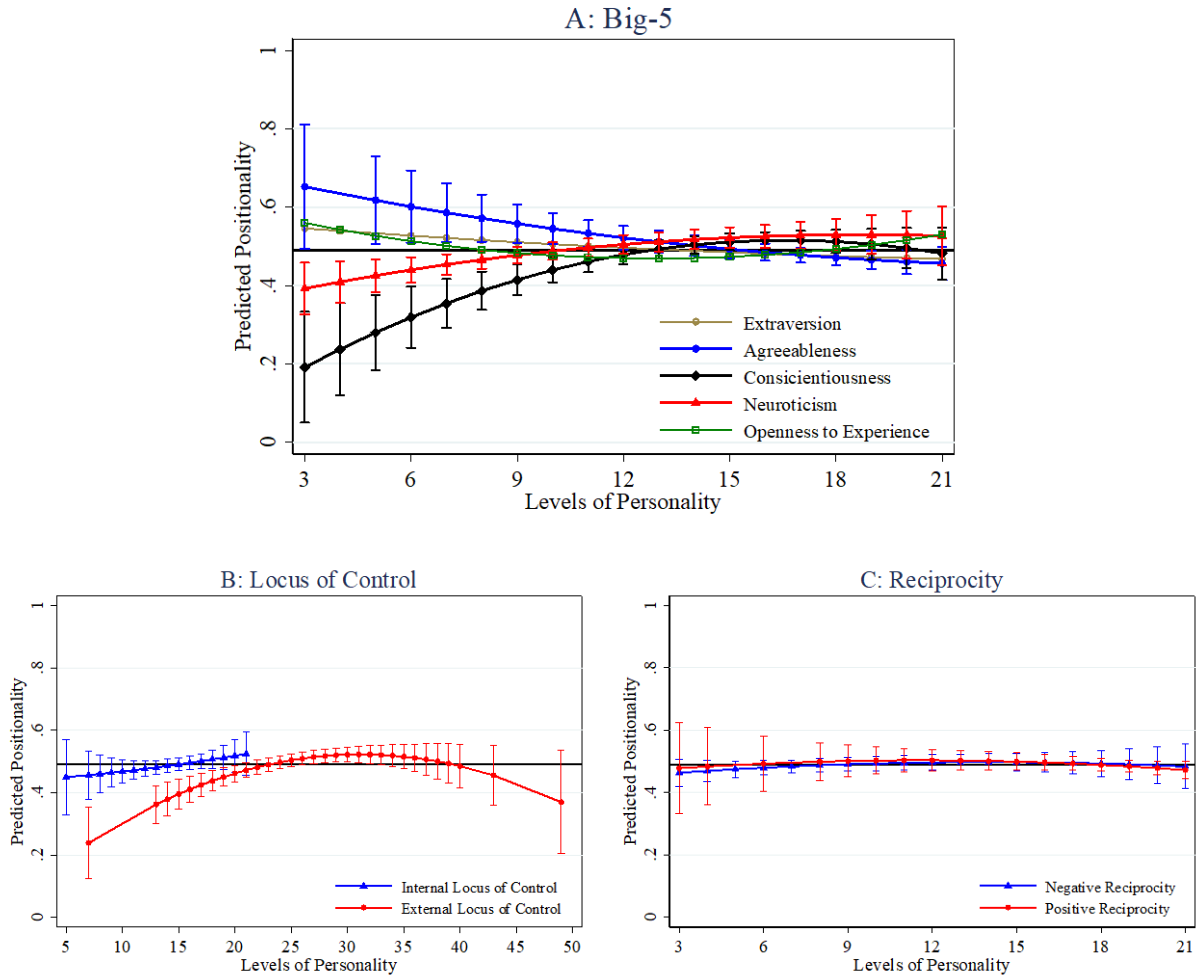
Note: The figures are obtained from the baseline interval regression. Separate models are estimated for Big-5 (A), locus of control (B), and reciprocity (C). We calculate the mean predictions and the standard errors for each values of personality and draw the 90% confidence intervals (vertical lines with caps). The horizontal line represents the overall mean degree of positional concerns, .492.

Parametric Results. The mean degree of positionality is predicted using the estimated baseline specification (2), i.e., interval regression, for the levels of each personality trait while keeping other observed characteristics of each respondent at their mean levels. To be brief, mean predicted degree of positionality for the levels of each personality trait are presented in Figure 2. We use our pooled experimental dataset that includes all "goods"

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and "bads" and the baseline specification given in equation (2). The three graphs show the predicted mean degree of positionality on the vertical axis and the observed levels of the respective personality traits on the horizontal axis. To add some flexibility, we include the quadratic function of each personality trait. We also tried alternative model specifications that included only a first- or third-degree polynomial, and the results turned out highly similar.

Panel (A) of Figure 2 shows the heterogeneity in the levels of each Big-5 personality measure. Agreeableness (filled circles), conscientiousness (diamonds), and neuroticism (triangles) are strongly related to positional concerns. The vertical lines at each observed personality value are the 90% confidence intervals, which are used to investigate whether the mean degree of positionality is statistically different from the overall mean positionality for a particular level of each personality trait. The horizontal line at .492 represents the predicted conditional overall mean degree of positionality obtained from the baseline interval regression. The mean degree of positionality is heterogeneous around the overall mean for the low and also partially high levels of each personality trait. For instance, low values of agreeableness (filled circles) are related with a very high level of positionality. These findings are consistent with previous findings that low agreeableness is correlated with less prosocial, i.e., lower levels of cooperative behavior, and a higher degree of spiteful behavior, which might trigger higher positional behavior. Consistently, the mean degree of positional behavior is gradually lower as the level of agreeableness is higher.

Low levels of conscientiousness (diamonds) are associated with very low levels of positional behavior, while the mean level of positionality is about the same as the overall mean degree of positionality for the higher values of conscientiousness (around median level, 12). Indeed, this result is highly in line with the predictions of personality psychology. Low conscientiousness is characterized by a tendency of laid back and a lower degree of success-driven behavior. Also, comparing the confidence intervals across the conscientiousness values suggests that the degree of positional concerns differ across the low and higher values. A partially similar pattern is observed for neuroticism (triangles). That is, lower values of neuroticism, i.e. higher emotional stability, are associated with lower mean positionality values (lower than the overall mean), and vice versa. We also find that the mean level of positionality is higher than the overall mean degree of positionality for very low values of extraversion (empty circles) and of openness-to-

experience (empty squares). Note that the mean degree of positionality is almost the same for the median levels (12–14 on the horizontal axis) of each Big-5 personality trait, and for higher values of these traits, the mean degrees of positionality converge toward the overall mean degree of positionality, i.e., the horizontal line at .492. The results for ILOC and ELOC are given in Panel (B). As can be seen, the mean degree of positionality varies marginally across the ILOC values; there is only a slight positive slope. As for ELOC, the mean degree of positionality is significantly lower than the overall mean only at lower values. Comparing confidence intervals across the ELOC levels suggests that positional concerns are heterogenous across these levels. The final panel of Figure 2 (Panel C) presents the patterns for NR and PR. On average, positionality does not vary with reciprocity to any significant degree.

Patterns by Goods: Non-Parametric Results. The results from the baseline parametric interval regression model in Figure 2 suggest that mean degree of positionality is heterogeneous around the overall mean degree of positionality, especially for the low and high levels of most personality traits. We will now present more detailed results for each good and will in particular focus on how the mean degree of positionality differs between the low and high levels of each personality trait. In order to define the low and high levels, we use the first and third quartiles of each personality trait. Then we compare the mean degrees of positional concerns of these two groups. One important remark is that the cell size in the first and third quartiles is small to obtain meaningful heterogeneity results with our baseline parametric model specification. To deal with potential bias due to small sample size, we use the Spearman-Karber estimator, which is a non-parametric and robust with respect to potential bias due to low sample size (Carlsson and Martinsson, 2001; Johansson-Stenman et al., 2002).

The idea behind our choice of estimator is as follows. If a respondent chooses the positional alternative in a choice situation (which signals that the respondent has stronger positional concern than the one implied in the choice situation), then the respondent "survives" until the next choice situation, and so on. There are three choice situations where respondents can terminate in any choice situation or survive all three. Each choice situation is assigned an implicit degree of positionality, $\tilde{\theta}_1, \tilde{\theta}_2$, and $\tilde{\theta}_3$, and for each case a proportion of respondents survive, P_1, P_2, and P_3. The Spearman-Karber estimator is then formed as:

Figure 3. Heterogeneity of Positionality by Goods: Non-Parametric Estimator
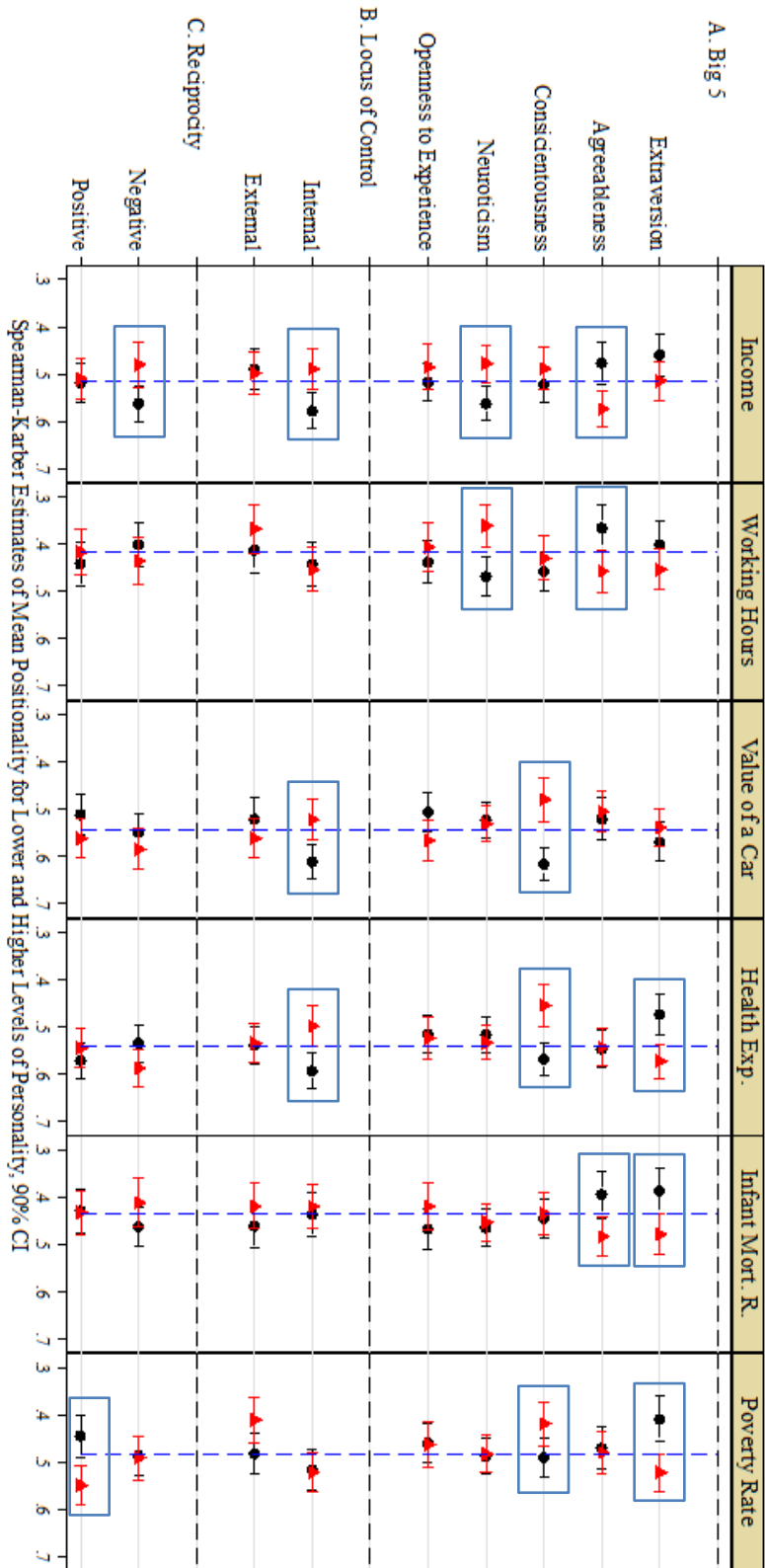
$$SK_g = \left[\sum_{j=0}^{4}(P_{j+1} - P_j)(\tilde{\theta}_j + \tilde{\theta}_{j+1})\right]/2, \tag{5}$$

where we assume $P_0 = 0$, $P_4 = 1$, and $\tilde{\theta}_0 = 0$, $\tilde{\theta}_4 = 1$ for the lower and upper boundaries, and $\tilde{\theta}_1 = .25$, $\tilde{\theta}_2 = .5$, and $\tilde{\theta}_3 = .75$. The variance of the estimator is:

$$V[SK_g] = \left[\sum_{j=0}^{4}(\tilde{\theta}_j + \tilde{\theta}_{j+1})^2 P_j(1 - P_j)/n_j\right]/4, \tag{6}$$

where n_j is the number of respondents who choose the positional alternative in each choice situation. Equation (6) is then used to calculate the confidence intervals of estimates.

Figure 3 illustrates the results for each good and can be interpreted as follows: vertical (dashed) lines represent good-specific overall mean level of positionality estimated with the non-parametric estimator. The mean degree of positionality for the low values of the personality traits is given by a triangle symbol and for high values of personality by circles. The lines around the circles and triangles represent 90% confidence intervals. Therefore, the figure shows not only whether the low and high values of each personality trait statistically differ from the good-specific overall mean but also whether the mean degrees of positionality of the low and high values of each personality trait statistically differ from each other. We drew a box around the cases where there is a statistically significant difference between the estimated mean degrees of positional concern associated with the low and high levels of the respective personality trait. Overall, the mean degrees of positionality associated with the low and high levels of the personality traits vary across the goods, which is highly in line with the average effects reported in Table 3.

5. Concluding Discussion

There is a growing interest in the relationship between personality characteristics and the economic outcomes of individuals. Drawing on the literature in this domain, this paper examines the direct relationship between a wide range of personality characteristics and the degree of positional concerns with respect to a number of goods using a tailor-made survey experiment. Our results suggest that there are substantial relationships between personality characteristics and positional concerns. In most cases, the signs and significance of the relationships are found to be consistent with recent studies (Budria and

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Ferrer-i-Carbonell, 2018; Cuesta and Budria, 2015) based on the life-satisfaction surveys. The results further demonstrate that the relationships between personality traits and positional concerns differ not only across different goods and but also across the values of each personality trait. The results are robust with respect to estimators, potential confounding factors, and order effects.

Our paper can be concluded as follows. First, as previously demonstrated by many studies in the literature, respondents show a substantial level of positional concerns, although we note considerable variation across goods in this regard. The overall mean level of positional concern is found to be about .49, which is highly in line with the previous literature (e.g., Alpizar et al., 2005; Akay et al., 2013). Second, most personality characteristics are significantly related to the degree of positional concern. The association between agreeableness and positional concerns is negative, while conscientiousness, neuroticism, and external locus of control are positively related. Third, the relationship between personality and positionality differs depending on the good considered. While conscientiousness and neuroticism are significantly related to positional concerns regarding most goods, extraversion and positive reciprocity play a significant role only for the "bads." The signs and significance of these relationships are highly consistent with the suggestions provided in the field of personality psychology. Finally, we show that mean degree of positionality across the levels of personality characteristics are heterogeneous across the lower and higher values of most personality characteristics. One important finding of this paper is that, in most cases, the association between personality traits and positional concerns are stronger for the lower values of each personality trait. A low score on agreeableness, for instance, relates to a very strong positional behavior, while low conscientiousness and neuroticism scores relate to less positional behavior. The analysis also unveils that while the degrees of positionality differ significantly between the lower and higher values of some personality characteristics, the mean level of positionality converges toward the overall mean level of positionality for the medium-to-high values of most personality characteristics.

Overall, this paper brings a new set of evidence regarding the relationship between personality characteristics and positional concerns using a survey-based experiment. Our results offer important conceptual implications. Considering that the personality

characteristics constitute a set of proxies of non-cognitive skills, these skills relate to positionality when they are in lower levels. That is, the higher edge of these skills does not necessarily translate into a better or worse economic outcome. Our results call for further investigation of the relationship both in methodological and conceptual terms and suggest that the relationship between personality and economic outcomes should be interpreted with caution in economic models that takes non-cognitive skills into account. Most importantly, future research should investigate why personality characteristics and positional concerns are strongly associated mostly at the lower levels and why most non-cognitive skills tend to generate similar positionality outcomes at their higher levels.

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Appendix A. The Survey Experiment (After-tax Income/Month)

Income of your future relative (1)
In the situation below, make a choice between society A and society B for your future relative.

Society A: – Your relative's income is 2000 TL/month after tax
               – The average income in society is 2200 TL/month after tax

Society B: – Your relative's income is 1800 TL/month after tax
               – The average income in society is 1400 TL/month after tax

Everything, including the price levels, are same in two societies. In both societies your relative works 40 hours per week and this is equal to the average weekly work hours. Choose the society in which your future relative will be most content.

Society A	**Society B**
☐	☐

Income of your future relative (2)

In the situation below, make a choice between society A and society B for your future relative.

Society A: – Your relative's income is 2000 TL/month after tax
               – The average income in society is 2200 TL/month after tax

Society B: – Your relative's income is 1550 TL/month after tax
               – The average income in society is 1300 TL/month after tax

Everything, including the price levels, are same in two societies. In both societies your relative works 40 hours per week and this is equal to the average weekly work hours. Choose the society in which your future relative will be most content.

Society A	**Society B**
☐	☐

Income of your future relative (3)

In the situation below, make a choice between society A and society B for your future relative.

Society A: – Your relative's income is 2000 TL/month after tax
               – The average income in society is 2200 TL/month after tax

Society B: – Your relative's income is 1220 TL/month after tax
               – The average income in society is 1160 TL/month after tax

Everything, including the price levels, are same in two societies. In both societies your relative works 40 hours per week and this is equal to the average weekly work hours. Choose the society in which your future relative will be most content.

Society A	**Society B**
☐	☐

Appendix B. Personality Inventories and Measures

B.1. Big-5 personality inventory

Table B.1. Big-5 Inventory

I see myself as someone who...
Q1. ...does a thorough job
Q2. ...is communicative, talkative
Q3. ...is sometimes somewhat rude to others
Q4. ...is original, comes up with new ideas
Q5. ...worries a lot
Q6. ...has a forgiving nature
Q7. ...tends to be lazy
Q8. ...is outgoing, sociable
Q9....values artistic experiences
Q10. ...gets nervous easily
Q11. ...does things effectively and deficiently
Q12. ...is reserved
Q13. ...is considerate and kind to others
Q14. ...has an active imagination
Q15. ...is relaxed, handles stress well

a. Own collection and calculations by authors.

b. The respondents were given the following instruction: "Here indicate how closely you agree with the statement by checking one of the boxes on the scale from 1 to 7. 1 means you completely disagree, and 7 means you completely agree. If your views fall somewhere in between, you can choose any number in between."

c. The inventory is taken from the German Socio-Economic Panel (GSOEP).

d. The components of the Big-5 measure are calculated as follows: *Extraversion*: Q2 + Q8 + Reversed(Q12); *Agreeableness*: Q3 + Q6 + Reversed(Q13); *Conscientiousness*: Q1 + Reversed(Q7) + Q11; *Neuroticism*: Q5 + Q10 + Reversed(Q15); *Openness-to-experience*: Q4 + Q9 + Q14;

B.2. Internal and External Locus of Control

Table B.2. Locus of Control Inventory

Q1. How my life goes depends on me

Q2. Compared to other people, I have not achieved what I deserve

Q3. What a person achieves in life is above all a question of fate or luck

Q4. If a person is socially or politically active, he/she can have an effect on social conditions

Q5. I frequently have the experience that other people have a controlling influence over my life

Q6. One has to work hard in order to succeed

Q7. If I run up against difficulties in life, I often doubt my own abilities

Q8. The opportunities that I have in life are determined by the social conditions

Q9. Inborn abilities are more important than any efforts one can make

Q10. I have little control over the things that happen in my life

a. Own collection and calculations by authors.

b. The respondents were given the following instruction: "Here indicate how closely you agree with the statement by checking one of the boxes on the scale from 1 to 7. 1 means you completely disagree, and 7 means you completely agree. If your views fall somewhere in between, you can choose any number in between."

c. The inventory is taken from the German Socio-Economic Panel (GSOEP).

d. *Internal* locus of control measure is calculated as Q1 + Q6 + Q9 and *external* locus of control is calculated by adding the response scores for the remaining questions.

B.3. Positive and Negative Reciprocity

Table B.3. Reciprocity Inventory

Q1: If someone does me a favor, I am prepared to return it
Q2: If I suffer a serious wrong, I will take revenge as soon as possible, no matter what the cost
Q3: If somebody puts me in a difficult position, I will do the same to him/her
Q4: I go out of my way to help somebody who has been kind to me before
Q5: If somebody offends me, I will offend him/her back
Q6: I am ready to undergo personal costs to help somebody who helped me before

a. Own collection and calculations by authors.

b. The respondents were given the following instruction: "Here indicate how closely you agree with the statement by checking one of the boxes on the scale from 1 to 7. 1 means you completely disagree, and 7 means you completely agree. If your views fall somewhere in between, you can choose any number in between."

c. The inventory is taken from the German Socio-Economic Panel (GSOEP).

d. The positive reciprocity measure is calculated as Q1 + Q4 + Q6 and the negative reciprocity measure is calculated as Q2 + Q3 + Q5.