Deckers, Thomas; Falk, Armin; Kosse, Fabian; Szech, Nora

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Thomas Deckers, Armin Falk
Fabian Kosse, Nora Szech

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Wissenschaftszentrum Berlin für Sozialforschung gGmbH
Reichpietschufer 50
10785 Berlin
Germany
www.wzb.eu

Affiliation of the authors:

Thomas Deckers, University of Bonn, Bonn Graduate School of Economics (BGSE),
thomas.deckers@uni-bonn.de

Armin Falk, University of Bonn, Center for Economics and Neuroscience (CENs),
armin.falk@uni-bonn.de

Fabian Kosse, University of Bonn, Institute for Applied Microeconomics,
kosse@uni-bonn.de

Nora Szech, Karlsruhe Institute of Technology (KIT), Berlin Social Science Center (WZB), and CESifo
nora.szech@kit.edu

Abstract

Homo moralis: Personal characteristics, institutions, and moral decision-making

This paper studies how individual characteristics, institutions, and their interaction influence moral decisions. We validate a moral paradigm focusing on the willingness to accept harming third parties. Consequences of moral decisions are real. We explore how moral behavior varies with individual characteristics and how these characteristics interact with market institutions compared to situations of individual decision-making. Intelligence, female gender, and the existence of siblings positively influence moral decisions, in individual and in market environments. Yet in markets, most personalities tend to follow overall much lower moral standards. Only fluid intelligence specifically counteracts moral-eroding effects of markets.

Keywords: homo moralis, moral personality, real moral task, markets and personality, trade and morals

JEL: D02, D03, J10

1. Introduction

This paper explores the relationship between individual characteristics, institutions and moral behavior, focusing on the willingness to accept harming third parties. Consequences of moral decisions are real. We study how moral behavior varies with individual characteristics and how these characteristics interact with institutions, comparing individual situations to market environments. We find that generally, moral behavior is higher for more intelligent people, females and people with siblings, and correlates positively with religiousness and vegetarianism. This is true for individual as well as for market situations. Therefore, a moral personality, a homo moralis, seems to exist – a personality that tends to follow higher moral standards compared to others.

In markets, moral values are overall much lower than in individual decision-making. Homo moralis characteristics help keeping higher moral standards, and high fluid intelligence even has an over-proportionally protecting impact, helping people to keep exceptionally high moral standards in an overall morals-eroding institution.

Investigating the influence of individual characteristics on levels of morality is an interesting topic in itself. Yet it is also of political relevance. Depending on what kind of moral outcome organizations aim to implement, they may target people with specific individual characteristics. Such targeted subgroups could be males or females, the old or the young, people of high or low intelligence, the rich or the poor. Individual characteristics may play important roles in committee-decisions on morally relevant questions, thereby affecting ethical judgments of various boards. Likewise, work ethics may be shaped by what kind of personalities run a company. If a glass ceiling or other kinds of discrimination prevent certain subgroups, e.g. females, from climbing job ladders, business ethics of a company could suffer. On a broader level, societies may develop into different moral directions depending on whether socio-demographics matter for political representation or not.

Research in the social sciences points into the direction that moral behavior is malleable by institutional design.[1] It can make a huge difference whether people decide individually about a morally relevant issue, or whether they decide in groups or as market participants. Falk and Szech (2013a) document that markets can cause drastic moral transgression, seducing people to support immoral outcomes they would individually object to. Kirchler et al. (forthcoming) confirm this effect, and demonstrate its robustness for a variety of institutional details. The findings raise the question where markets are morally appropriate, and in which form. The debate of markets and morality has recently received much attention (Sandel 2012; Satz 2010). If markets erode moral standards, discussing policy interventions may become important.

Little to nothing is known about a potential heterogeneity in institutional effects on moral behavior. Do markets affect all kinds of individuals in comparable ways, or do certain characteristics in humans render them more or less prone to influences of market activity? Understanding which individuals are specifically tempted by markets

[1] For a comprehensive overview of the literature, see Haidt and Kesebir (2010).

could inform debates on market regulation and alternative policies, such as campaigns targeted at specific subgroups of market participants. For example, it may require a high level of intelligence to understand market mechanisms in order to resist their effects on moral behaviors. If this is the case, policy intervention could help in making market forces more transparent and understandable for less reflected market participants.

Previous work in the social sciences provides evidence on the relevance not only of institutional factors, but also of emotional and situational factors for moral decision-making. Randomly varied emotional states, e.g., shape moral judgment in the well-known Trolley problem (e.g., Valdesolo and DeSteno 2006) or judgment of characters in vignette studies (Schnall et al. 2008). The power of situational and institutional factors in affecting moral behaviors has been repeatedly documented in various contexts, e.g., in the large bystander effect literature (Darley and Latané 1968, Latané and Nida 1981, Fischer et al. 2011), as a consequence of authority (Milgram 1963), delegation (Hamman et al. 2010, Bartling and Fischbacher 2012), market institutions (Falk and Szech 2013a), exogenous or endogenous diffusion of pivotality (Bandura 1977 and 1999, Falk and Szech 2013b), or other forms of "moral wriggle rooms" (Dana et al. 2007). While researchers have uncovered intuitive, emotional and situational factors, little is known, however, about the role of individual characteristics as key drivers of moral decision making in real situations. In this paper we therefore explore differences at the level of the individual as a systematic source of variation in moral outcomes. We study both, how individual characteristics affect the level of morality in general, as well as how they help explaining the effects of markets as one omnipresent and specifically important institution on moral behavior.

To study the role of individual specific moral decision-making, we use a real task that is behaviorally relevant and incentivized. This differentiates our study from a vast literature in business ethics that explores the relation between morality and personal characteristics using questionnaires and hypothetical scenarios (see Ford and Richardson 1994, Loe et al. 2000, and O'Fallon and Butterfield 2005 for overviews). According to an almost universal conception of morality, harming third parties in an unjustified and intentional way is viewed as immoral.[2] It is this conception of morality that inspired our choice paradigm. In the experiment subjects faced the decision of receiving money and killing versus receiving no money and saving the life of an animal.[3] Consequences of decisions taken by subjects were implemented exactly as stated in the instructions of the experiment. Thus, our choice paradigm involves a morally demanding decision since killing an animal for money implies the intentional harming of a third party for purely selfish reasons. The fact that a third party is effectively harmed, differentiates our paradigm not only from survey-based research

[2] Compare, e.g., Bernard, "The Definition of Morality", The Stanford Encyclopedia of Philosophy (Fall 2012 Edition), Zalta (ed.): "In this descriptive sense, although avoiding and preventing harm is common to all, "morality" can refer to codes of conduct of different societies with widely differing content, and still be used unambiguously."

[3] The animals involved were so-called „surplus mice" from animal laboratories. They were bred for animal studies but turned out to be unnecessary. They would all have been killed without our research projects. See the next section for details.

and from staged or faked experiments, but also from experiments that involve only monetary consequences.

We proceed in three steps. First, we provide evidence for convergent and discriminatory validity of our measure. In particular, we present evidence for convergent validity by showing highly significant correlations of willingness to kill the animal with Agreeableness (negative) and Machiavellianism (positive). Agreeableness is one of the five facets of the Big Five inventory and associated with a general pro-social disposition (Graziano et al. 2007). Machiavellianism represents a tendency to be unemotional, and therefore able to detach oneself from morality (O'Fallon and Butterfield 2005, Ford and Richardson 1994). To rule out that our measure simply picks up e.g. a preference for animals or differences in the demand for money (discriminatory validity), we explore the relationship between willingness to kill and having a pet, professional involvement in animal experiments, and disposable monthly income. None of these factors is significantly correlated with our measure of morality. Our choice paradigm therefore not only incorporates a decision context that is informed by a general consensus about morality, i.e., intentionally harming a third party, it also fulfills the requirements for convergent and discriminatory validity.

In a second step we study whether individual differences predict variations in moral decision making. We focus on four characteristics, which are plausibly exogenous to moral behavior: gender, intelligence (IQ), age, and being a single child. The dependent variable is immorality, the willingness to kill a mouse for ten euros. We find that women are significantly less willing to kill their mouse for money, in comparison to men. Likewise, more intelligent subjects show a lower propensity to kill than subjects with a lower IQ. Subjects without brothers or sisters are more likely to kill than other subjects. While there is a tendency for older subjects to kill less, the effect is small. Given the condensed age distribution of our student sample, however, the effect of age is most likely not well identified. Gender, IQ and being a single child significantly predict moral outcomes, both individually as well as in multivariate regressions where we also include additional potentially related variables. Of course, in case of gender, the question remains whether nature, nurture, or an interaction of the two, cause the results.

Two further individual characteristics, which are likely associated with moral disposition but which do not allow for a straightforward causal interpretation, are religiousness and being a vegetarian. Religious inclinations as well as being a vegetarian are potential expressions of normative concerns, unless, e.g., that the decision to become a vegetarian is solely determined by health considerations. We therefore hypothesized that both facets should correlate positively with moral behavior. In multivariate regressions where we include the exogenous drivers of morality (gender, IQ, single child, and age) together with these variables, religiousness and being a vegetarian are significantly associated with a lower propensity to kill. In sum, our analysis reveals a systematic pattern of individual characteristics contributing to explain heterogeneity in moral behavior. The overall explained variance is about 18.0 percent[4] and the

[4] R^2 refers to a linear probability model with the specification of Table 3 Column (3).

observed effects are sizable. For example, relative to female subjects, male subjects are 12.9 percentage points[5] more likely to kill a mouse. Likewise, a one standard deviation increase in IQ (comprising standardized measures of both, fluid and crystallized intelligence) reduces the likelihood of killing by 11.5 percentage points.

Conceivably, individual characteristics not only affect the level of moral decision-making in a given context, but also might shape the extent to which situational or institutional factors affect moral outcomes. In a third step, we therefore move beyond documenting level effects and show how individual characteristics contribute to moral decisions in market versus non-market situations. Markets are omnipresent in our societies and therefore institutions of specific importance. In the markets investigated, buyers and sellers negotiate prices to trade an item. Using the mouse paradigm described above, Falk and Szech (2013a) show that markets erode moral values: Significantly more subjects are willing to trade and kill their mouse in markets (double-auctions) compared to the individual, i.e., non-market, conditions. Reanalyzing their data, we were interested in how individual differences affect the influence of markets on moral behavior. Interacting a set of individual characteristics with randomized market participation, we find that the moral-eroding effect of markets exists for basically all individuals. None of the characteristics under study protects from the moral-eroding effect of markets. The only exception is a specific sub-dimension of intelligence. On average, higher fluid intelligence shows an attenuating impact on the eroding effect. Although individual characteristics have a decisive impact on the level of moral behavior, situational or institutional factors largely uniformly affect moral decision making.

The individual characteristics analyzed in this paper are of particular interest. For example, documenting a gender effect on moral disposition adds to the mounting evidence on systematic gender differences in economic preferences and behaviors, such as risk preferences (Dohmen et al. 2011, Croson and Gneezy 2009), social preferences (Croson and Gneezy 2009), egalitarianism (Andreoni and Vesterlund 2001, Fehr et al. 2008, Croson and Gneezy 2009), competitiveness (Gneezy et al. 2003, Niederle and Vesterlund 2007, Dohmen and Falk 2011), or overconfidence (Lundeberg et al. 1994, Barber and Odean 2001). A gender difference in moral behavior may serve as explanation why firms that are predominantly run by female managers tend to be more open to adopting ethical standards and products (Smith and Oakley 1997, Weeks et al. 1999). In a related vein, Chonko and Hunt (1985) find in a questionnaire-study that male managers are less morally concerned than female managers. Further support for higher moral standards in females comes from Barnett and Karson (1989) studying ethical views in insurance company employees.[6] In a study by Jones and Gautschi (1988) focusing on MBA students, females are furthermore found to be less loyal to ethically questionable organizations than males. Yet again, this study does not involve a real moral decision task with real consequences.

[5] Average marginal effect after Probit, see Table 3 Column (3).
[6] Additional support for gender influences on moral behavior comes from Bellizi and Hite (1989) looking at sales managers and executives.

Our findings on single children complement work showing that being a single child is associated with being more egocentric and less cooperative (Jiao et al. 1986). With regard to age, looking at findings from questionnaire studies, effects on moral behavior seem to be mixed. While Shafer et al. (2001), Ross and Robertson (2003) and Larkin (2000) find no significant effect of age on ethical decision making, Razzaque and Hwee (2002), Latif (2000), and Eynon et al. (1997) observe a negative relationship. In line with the latter studies, we find that older subjects tend to behave less morally. Yet of course this finding has to be handled with caution as age does not vary very much in our student sample. Note also that there is some evidence pointing into the other direction. For example, Lund (2000) and Karcher (1996) find that older participants tended to be more ethical in questionnaire studies. Regarding religiousness, several studies relying on questionnaires point into the direction that religious beliefs positively correlate with higher ethical standards (e.g., McNichols and Zimmerer 1985, Wagner and Sanders 2001, see O'Fallon and Butterfield 2005 for an overview).[7] Our study confirms this finding in a real decision context. Rather religious participants are significantly less likely to agree to kill.

To the best of our knowledge, surprisingly little research has focused on the relation between intelligence and moral behavior. In a study with sixth- and seventh-graders, Nelsen et al. (1969) find that children with a higher IQ cheat less in a resistance-to-temptation task. In addition, they observe that more intelligent children score higher in a Kohlberg moral-judgment test. In a related vein, concerning IQ, we find a significant correlation between moral behavior and intelligence. Remarkably, fluid intelligence turns out to have specific "protective power", helping subjects to resist influences of markets. People of higher fluid intelligence are good in solving unfamiliar problems and logical thinking. This may help them to understand (and therefore resist) complex market mechanisms.

Our results suggest that intelligence is not only beneficial from a human capital or productivity perspective (e.g. Hanushek and Woessmann 2008) but also with regard to morality. The IQ effect is informative also from a bounded rationality perspective (Simon 1955). It suggests that the level of complexity associated with a given decision context contributes to moral transgression. Increasing complexity in daily decision-making could therefore favor immoral outcomes, both at the individual as well as at the societal level. If decision-makers are *tempted* into immoral activities as a consequence of complex environments, such environments do not only harm third parties, but also the decision-makers themselves. Feelings of guilt and bad conscience from decisions considered ex-post as wrong may be reduced by offering people decision contexts that are easily understandable. Policies designed to highlight consequences of decision making, e.g., consumption decisions, may thus easily improve overall welfare. Nudges, information campaigns or improved choice architectures could help aligning values and actions (Thaler and Sunstein 2008, Johnson 2012).

[7] Giacalone and Jurkiewicz (2003) however observe a positive correlation between spirituality and low standards in business ethics.

The remainder of the paper is organized as follows. Section 2 explains the experimental design, measures of individual characteristics and describes the validation of our measure of morality. Section 3 presents our main results on the level effects of individual characteristics, while section 4 discusses the effects of individual differences on the impact of markets on moral outcomes. Section 5 concludes.

2. Experimental design, measures of individual characteristics, and validation of morality measure

2.1 Experimental design

We use data from Falk and Szech (2013a) to relate moral behavior to institutions and personality. This study introduced the Mouse Paradigm to elicit moral decision-making: Subjects chose between receiving money and agreeing to kill a mouse versus receiving no money and saving the life of a mouse. All mice involved were so-called "surplus mice". Even though perfectly healthy, these mice had turned out unnecessary for current animal studies. They would all have been killed following animal experimental protocols as keeping them alive would have been costly. The killing of surplus animals is a standard procedure in animal laboratories. Thus many mice that would have otherwise all been killed, were saved as a consequence of the experiment. Subjects were informed about the fact that mice were surplus mice in a post experimental debriefing.[8]

Falk and Szech (2013a) study four main different treatments, which involve the same consequences for mice. Respectively two of them are individual and market treatments. In **Individual Binary**, subjects faced a simple binary choice between either taking 10 euros and agreeing to kill a mouse or receiving no money and saving the life of the mouse (n=124). In a second individual decision treatment, **Individual Price-List**, subjects faced basically the same decision context but instead of simply taking a binary decision, they chose for various monetary amounts between money and agreeing to kill versus saving the mouse (n=96). Subjects knew that one of their decisions was randomly drawn and implemented with all consequences. Monetary amounts increased from 2.50 euros to 50 euros in steps of 2.50 euros. These two individual conditions were contrasted with decisions from two market treatments, where each subject took the role of either buyer or seller. Both markets were organized as continuous double auction markets, either bilaterally (with one buyer and one seller, **Bilateral Market**) or multilaterally (with seven buyers and nine sellers, **Multilateral Market**). In both markets, buyers and sellers bargained over trading and killing a mouse for a total gain of 20 euros that the two parties could split up between themselves as negotiated. The seller was initially endowed with a mouse. If a buyer and a seller agreed on a price, the buyer received 20 euros minus the price while the seller received the price. As another consequence if a price was agreed upon, the mouse was traded and killed. No trader was forced to make a price offer. Subjects knew that each mouse that was not traded and killed was saved. Traders who did not conclude a trade did not earn any money in

[8] The study was ethically approved by the University of Bonn.

the market. There were 10 trading rounds in both markets, one was randomly selected and implemented. If a seller agreed to trade for 10 euros or less, we classify him or her as willing to agree to kill a mouse for 10 euros (or less). Sample sizes of sellers were. n=36 in the bilateral, and n=54 in the multilateral double auction. Our total sample hence consists of 310 subjects.

To allow for an identical measure of immoral behavior between treatments we define a subject as acting immorally if he or she is willing to kill a mouse for 10 euros or less. The variable *Immorality* takes value one if a subject agreed to kill a mouse for 10 euros or less and zero otherwise. Respective shares for our four treatment conditions are 43% for Individual Binary, 46% for Individual Price-List, 72% for Bilateral Market and 76% for Multilateral Market.

2.2 Measures of individual characteristics

As part of the experiment, all subjects answered a detailed questionnaire, including items on IQ, personality, socio-demographics and general values, such as religiousness. These measures will be used to study individual determinants of morality as well as the validity of our measure of morality (see below). Table 1 shows the descriptive statistics of all variables. In the following we describe each item in detail.

Intelligence. Following standard procedures, we measured both fluid and crystallized intelligence. Fluid intelligence is associated with logical reasoning in new and unfamiliar situations, and general intellectual capacity. In contrast, crystallized intelligence refers to knowledge that has been acquired during life, e.g., the vocabulary, and is thus considered to be more malleable. These two components constitute general intelligence or IQ (Cattell 1971).

To measure *fluid intelligence* we used 10 items of Raven's Advanced Progressive Matrices Plus (APM). The ten items were selected to achieve maximal discriminatory power in a ten-minute time frame. In the APM, subjects had to choose one out of eight possible symbols, which fits best into the missing cell of a matrix filled with black and white symbols. The standardized number of correctly selected items is our measure of fluid intelligence. *Crystallized intelligence* was elicited using a vocabulary test, called MWT[9] (Lehrl 2005). The MWT contains 37 items, which consist of five words each. Out of those five words, four are fake words, while only one word actually exists in the German language. Subjects had to indicate the correct word. The standardized number of correct items is our measure of crystallized intelligence. We also construct a joint measure of intelligence (*IQ score)* by adding up the standardized measures of crystallized and fluid intelligence.

Personality. To measure personality we elicited responses to the *Big Five* inventory, as well as the *Machiavellianism* questionnaire. The Big Five or Five-factor model is the most widely used taxonomy of personality traits. It originates from the lexical

[9] MWT is a German abbreviation and stands for „Mehrfachwahl-Wortschatz-Intelligenztest" which translates into "Multi-option Vocabulary Intelligence Test".

hypothesis of Allport and Odbert (1936), which postulates that individual differences are encoded in language (see Borghans et al. 2008). After years of research in this tradition, psychologists have arrived at a hierarchical organization of personality traits with five traits at the highest level. These Big Five facets, which are commonly labeled as openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism, capture personality traits at the broadest level of abstraction. Each of the Big Five traits condenses several distinct and more narrowly defined traits. It has been argued that the bulk of items that personality psychologists have used to measure personality can be mapped into the Big Five taxonomy (see, e.g., Costa and McCrae 1992). We elicited the Big Five facets using the standardized scores concerning 12 items respectively (60 items in total) of the NEO Five Factor Inventory (NEO-FFI) of McCrae and Costa (1989). We are mostly interested in the facet *agreeableness* to test for convergent validity of our morality measure (see below).[10]

As another test for convergent validity of our morality measure, we elicited the *Machiavellianism* questionnaire. In personality psychology, Machiavellianism refers to the tendency to disentangle oneself from conventional moral norms because of a generally unemotional attitude. We measured the degree of a person's Machiavellianism using the 20-item questionnaire of Christie and Geis (1970). On a 7-point Likert scale, subjects had to rate how much they agree to statements like "Never tell anyone the real reason you did something unless it is useful to do so" or "One should take action only when sure it is morally right" (reversed). Our measure for the degree of Machiavellianism is the standardized score of the 20 items after having inverted the scales for some items so as to always have high values corresponding to high scores in Machiavellianism.

Other Variables. Further individual characteristics that will be used in the analysis comprise the following:

Single Child: Subjects had to indicate whether they have siblings or not. The variable takes the value one if subjects do not have siblings.

Disposable income: We elicited monthly disposable income. Since the sample consists mainly of students, we explicitly reminded subjects to subtract possible rent costs from their income since for students these make up the biggest amount of fixed costs.

Religiousness: We asked subjects to rate themselves on a Likert scale from 1 (not at all) to 7 (very much) concerning how religious they are.

Vegetarian: The variable equals one if the subject is a vegetarian and zero otherwise.[11]

Having a pet: We asked subjects whether they currently own a pet. The variable takes value one if subjects have a pet and zero otherwise.

[10] See Table A1 in the Appendix for an analysis of all Big Five facets.

[11] There are many different definitions for being vegetarian (pesco-vegetarian, ovo-lacto-vegetarian, etc.), and we did not explicitly ask subjects whether they were vegans. We assume that all these subjects opted for vegetarian.

Studies related to animal experiments: Subjects had to indicate whether in their field of study they are exposed to animal experiments (in the broadest sense). The variable takes value one if subjects deal with animal experiments and zero otherwise.

Variable	Mean/Share	Standard Deviation
Fluid Intelligence (10 items)	5.306	1.842
Crystalized Intelligence (37 items)	30.400	3.239
Male	0.490	0.501
Age (in years)	24.145	3.647
Single Child	0.158	0.365
Religiousness (7-point Likert scale)	3.281	1.961
Vegetarian	0.110	0.313
Agreeableness (12 x 5-point Likert scale)	32.268	6.404
Machiavellianism (20 x 7-p. Likert scale)	55.165	13.453
Disposable income (in Euro)	350.274	238.163
Studies related to animal experiments	0.165	0.371
Having a pet	0.384	0.487
Observations	310	

Table 1: Descriptive statistics of individual characteristics.

2.3 Validation of our measure of morality

As we have argued above our measure of morality involves the decision to kill an animal for purely selfish reasons, qualifying as immoral behavior according to a widely held conception of immorality. Before we analyze individual determinants of moral behavior, we provide two validation checks for our measure. The first refers to convergent validity, i.e., the degree to which our measure is correlated with other measures that are theoretically predicted to be correlated. The two measures we use for testing convergent validity are Agreeableness and Machiavellianism. Agreeableness is one of the facets of Big-5, the most widely used taxonomy of personality traits. It refers to a tendency to be compassionate and cooperative rather than suspicious and antagonistic towards others. Machiavellianism describes a person's tendency to be unemotional, and therefore able to detach him- or herself from conventional morality. Convergent validity with our immorality measure would call for a negative correlation with Agreeableness and a positive correlation with Machiavellianism.[12] This is what we find. Table 2 reports the respective average marginal effects from Probit regressions with our measure of immorality as dependent

[12] On the relation between self-esteem and narcissism on aggression, see Bushman and Baumeister (1998).

variable. The two coefficients for Agreeableness and Machiavellianism have the predicted sign and are highly significant (see columns (1) and (2)). In all estimations we include treatment dummies for the four experimental conditions.

Average Marginal Effects (Probit)	Immorality (0/1)		
	(1)	(2)	(3)
Agreeableness (standardized)	-0.106***		
	(0.028)		
Machiavellianism (standardized)		0.085***	
		(0.027)	
Available money (standardized)			0.015
			(0.026)
Studies related to animal experiments			-0.004
			(0.075)
Having a pet			0.031
			(0.056)
Treatment dummies	Yes	Yes	Yes
Log likelihood	-194.25	-197.22	-201.84
Observations	310	310	310

Table 2: Validation of morality measure. Probit regression estimates (marginal effects), with binary outcome (Immorality: Agreeing to kill the mouse for 10 euros (or less) vs. not willing to kill) as dependent variable and standard errors in parentheses. *** indicate significance at the 1-percent-level.

A potential concern with our measure could arise if it would merely measure a resistance to kill a mouse for reasons unrelated to moral concerns. We therefore test for discriminant validity, i.e., we test whether concepts that are supposed to be unrelated with our measure are, in fact, unrelated. A potential candidate is disposable income in that subjects who dispose of more money simply find it easier to forgo money and save the life of a mouse. Likewise it could be argued that students who are professionally involved with animal research or animal experiments (such as medical students) perceive the decision problem as morally less relevant. Finally, we do not seek to measure a simple preference for animals, as expressed by having a pet at home. In column (3) of Table 2 we report respective marginal effects for these three items. It turns out that none of the items is significantly related with our measure of morality, neither separately nor jointly (Wald test: p=0.891). In sum the results from Table 2 confirm the convergent and discriminatory validity of our measure.

3. Individual differences in moral decision-making

We have now set the stage for the analysis of studying individual differences that determine moral decision-making. Our primary focus is on the impact of four central personal characteristics: gender, intelligence, age and being a single child. These characteristics are plausibly exogenous with respect to individual morality and moral behavior, and thus allow for a causal interpretation of correlations and regression results. Figure 1 shows the effect of each individual characteristic on moral decision-making. First, less intelligent people are more likely to act immorally. The figure shows results for the standardized general IQ score, i.e., the combined IQ measure for fluid and crystallized IQ, grouped in terciles of the IQ distribution. The differences are quite pronounced. While subjects in the first tercile display a killing rate of above 60%, the respective rate is only 54.3% for the second, and 44.0% for the third tercile, respectively. Overall, the correlation between IQ and willingness to kill rate is highly significant (Spearman rank correlation, $p<0.01$, two-sided). Second, men are more willing to engage in immoral behavior than women. While the fraction of women who are trading off life for money is 44.9%, the respective fraction is 61.8% for men. The difference is statistically significant at any conventional level ($p<0.01$, two-sample test of proportions, two-sided). Third, we find a weakly statistically significant effect of age (Spearman rank correlation, $p<0.1$, two-sided). The weak effect is not surprising given the fairly condensed age distribution typical for a student sample. Fourth, there is a striking difference between single children vs. subjects with siblings. While the share of willingness to agree to kill is 50.2% for the latter, the share for single children is 69.4% ($p<0.01$, two-sample test of proportions, two-sided).

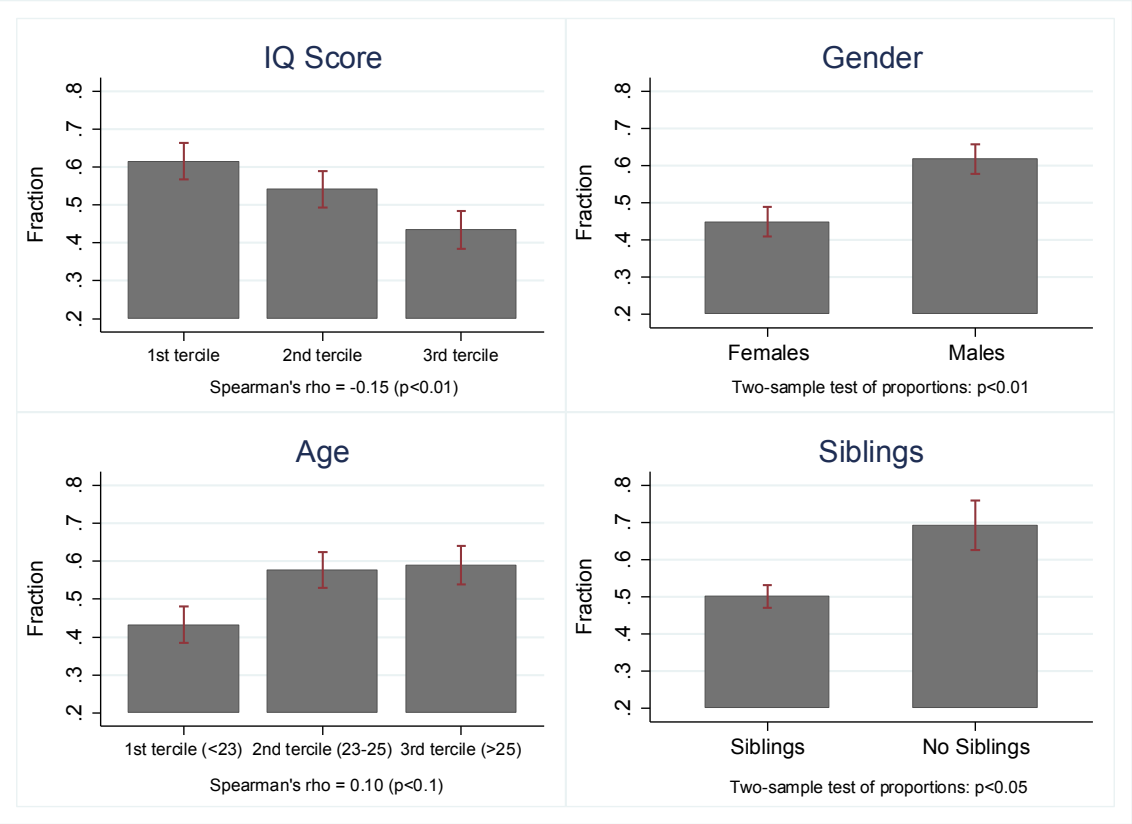

Figure 1: Individual differences in moral decision making. Displayed are the fractions of individuals who are willing to agree to kill their mouse for ten euros. n=310, error bars show standard errors of the means (SEM).

To determine the joint role of these four characteristics simultaneously, we estimated Probit regressions with an individual's immorality as dependent variable. All regressions include treatment dummies. Column (1) in Table 3 reports the respective coefficients on IQ, gender, age and single children as explanatory variables. The resulting coefficient estimates show that the unconditional results remain robust, with the exception of age. Higher levels of intelligence are associated with higher moral standards. Likewise, women are significantly less willing to engage in morally problematic activity than men. The effect on age is positive but insignificant. Single children are significantly less moral in comparison to subjects with siblings.

Column (2) adds further plausible correlates of moral decision-making, the degree of religiousness and being a vegetarian. These factors are potentially endogenous to moral dispositions, e.g., if the decision to become a vegetarian is driven by moral rather than health concerns. More religious people as well as vegetarians show significantly higher moral concerns. On average being a vegetarian reduces the willingness to kill by about 25%-points. Note that adding these attitudes leaves the coefficients of IQ, gender and single children basically unchanged.

To rule out effects that are related to the paradigm but not to moral concerns, column (3) adds further controls. These include disposable income, having a pet and being

exposed to animal experiments. All results remain virtually unchanged (compare Table 2). In sum, the descriptive results from Figure 2 are confirmed in a multivariate regression analysis. In addition we find significant effects for religiousness and being vegetarian.[13]

Average Marginal Effects after Probit	Immorality (0/1)		
	(1)	(2)	(3)
IQ score (standardized)	-0.094***	-0.114***	-0.115***
	(0.028)	(0.026)	(0.026)
Male	0.154***	0.117**	0.129**
	(0.054)	(0.053)	(0.054)
Age (in years)	0.009	0.009	0.010
	(0.008)	(0.008)	(0.008)
Single child	0.176***	0.154**	0.157**
	(0.068)	(0.067)	(0.067)
Religiousness (standardized)		-0.071***	-0.071***
		(0.026)	(0.026)
Vegetarian		-0.248***	-0.251***
		(0.079)	(0.080)
Treatment dummies	Yes	Yes	Yes
Additional controls	No	No	Yes
Log likelihood	-190.29	-183.58	-182.94
Observations	310	310	310

Table 3: Individual differences in moral decision-making. Probit regression coefficient estimates (marginal effects), with binary outcome (Immorality: Agreeing to kill the mouse for 10 euros (or less) vs. not willing to kill) as dependent variable and robust standard errors in parentheses. ***, **, * indicate significance at the 1-percent, 5-percent and 10-percent-level, respectively. Additional controls in column (3) include disposable income, having a pet and being exposed to animal experiments.

[13] Focusing on the data from the individual treatments only, effects are overall very similar to effects in the overall data set, see Table A2 the Appendix for details.

4. Interaction of personality and market institutions

In the final step of the analysis, we investigate whether the effects of institutions on moral behavior are uniform or depend on individual characteristics. As discussed in Falk and Szech (2013a) willingness to agree to kill is much higher in the market environments than in individual decisions. The fact that treatment assignment was random implies that market trading causally increases morally problematic behavior. It remains open, however, whether markets affect all subjects in similar ways, or whether exposure to markets affects subgroups of the population differently. Nothing is known about possible individual specific effects of market institutions. Such an understanding, however, would be informative for policies designed to limit moral transgression. For example, it would allow targeting specific groups of traders and customers that have been identified to be particularly responsive to market exposure or participation.

In order to simplify the analysis and to obtain sample sizes that allow testing for interactions of markets and individual characteristics, in the analysis we distinguish between treatment "Individual" (Individually Binary and Individually Price-List) on the one hand and treatment "Market" (Bilateral Market and Multilateral Market) on the other hand.[14] In Individual, 44.5% (n=220) of the participants are willing to agree to kill their mouse for 10 euros. In Market, 74.4% (n=90) are willing to kill the mouse for 10 euros. The difference of 29.9 percentage points is highly significant ($p < 0.001$, two-sample test of proportions, two-sided).

To explore how markets affect decision makers with different characteristics, we present multivariate between-subject-comparisons. In order to identify potential individual specific responses to institutional differences, we estimate models including interaction terms:

$$E[y|x_j, d] = Prob(y = 1|x_j, d) = G\left(\beta_0 + \beta_{treat}\, d + \sum_{j=1}^{k} \beta_j\, x_j + \sum_{j=1}^{k} \beta_{treat*j}\, d\, x_j\right) = G(A)$$

Equation 1: Estimation model including interaction effects.

where y is the binary outcome (Immorality: Agreeing to kill the mouse for 10 euros (or less) vs. not willing to kill), x_j with $j = 1, \dots, k$ are the individual specific variables and d is a treatment dummy indicating Market vs. Individual treatment. $G(A)$ is, depending on the estimation method, either the identity function ($G(A) = A$, linear probability model) or the standard normal cumulative distribution function ($G(A) = \Phi(A)$, Probit).

To identify potential individual specific responses to the market environment, we analyze cross derivatives with respect to individual characteristics and the treatment dummy $\frac{\Delta(\partial E[y|x_j,d]/\partial x_j}{\Delta d}$. Estimation results concerning these interaction effects are

[14] Note that the willingness to kill does neither differ within individual nor within market treatments ($p > 0.6$ respectively, two-sample test of proportions, two-sided).

presented in Table 4. Columns (1) and (2) present results of linear probability (OLS) models. In Column (1) the individual specific variables are IQ, gender, age and single child status. In Column (2) we add, as in Table 3, the correlates degree of religiousness and being a vegetarian. Columns (3) and (4) mirror Column (1) and (2) but are based on Probit estimations. In contrast to linear models, marginal effects and thereby interaction effects in nonlinear models as Probit vary by an individuals' levels of all explanatory variables.[15] For comparison to the OLS estimates and since we are interested in the general mechanism we focus on average interaction effects which are calculated as differences in average marginal effects (see Appendix A1 for details).

	Average interaction effects: $\frac{\Delta(\partial E[y\|x_j,d]/\partial x_j}{\Delta d}$			
Individual characteristics x_j:	OLS (1)	OLS (2)	Probit (3)	Probit (4)
IQ score (std.)	0.015	0.003	-0.011	-0.029
	(0.045)	(0.044)	(0.059)	(0.056)
Male	-0.071	-0.062	-0.083	-0.091
	(0.117)	(0.116)	(0.112)	(0.110)
Age (in years)	0.017	0.017	0.015	0.017
	(0.021)	(0.020)	(0.021)	(0.020)
Single child	0.047	0.068	0.063	0.119
	(0.124)	(0.119)	(0.132)	(0.117)
Religiousness (std.)		-0.026		-0.023
		(0.063)		(0.058)
Vegetarian		-0.029		-0.104
		(0.178)		(0.175)

Table 4: Average Interaction Effects of Individual Characteristics and Market treatment. Models are specified as described in Equation (1). Columns (1) and (2) are estimated using OLS, Columns (3) and (4) are estimated using Probit. The outcome variable is binary (Immorality: Agreeing to kill the mouse for 10 euros (or less) vs. not willing to kill), robust standard errors in parentheses. ***, **, * indicate significance at the 1-percent, 5-percent and 10-percent-level, respectively.

The interpretation of the coefficients is straightforward. A positive coefficient indicates that an increase (for continuous variables) in the certain characteristic implies on average an enforced moral-transgressing effect of the market. A negative coefficient indicates that an increase in the characteristic implies a weakened transgressing effect. But over both specifications and both estimation methods none of the average interaction effects is statistically significant different from zero at any conventional level[16] which indicates that none of the characteristics under study protects from the

[15] See, e.g., the discussion in Green (2010).
[16] Smallest p-value concerns the interaction effect with single child status(p=0.310, two-sided t-test)

moral-eroding effect of markets -- with the notable exception of fluid intelligence. While both fundamental parts of general intelligence (fluid and crystalized) are related to moral decision making (see Table A3), only the fluid component shows an interaction effect with the market environment. Repeating e.g. the analysis as in Table 4 Column (4) but replacing the general IQ score by only the fluid component of intelligence results in a significant negative average interaction effect ($p=0.073$, two-sided t-test). This means fluid intelligence tends to attenuate the moral-transgressing effect of markets. The effect size of the interaction effect is -0.090 which means that on average if fluid intelligence increases by one standard deviation the moral transgression effect is reduced by about one third (compare to the 29.9 percentage points reported above).

To explore the interaction between market environment and fluid intelligence in more detail we estimate kernel-weighted local polynomial regressions. This flexible nonparametric approach allows us to explore potential nonlinearities in the relations between morally problematic behavior, fluid intelligence and market environment. Graph A1 shows the results of regressions of morally problematic behavior on fluid intelligence separately for the Individual and the Market treatment. The estimations confirm the above presented results of a general reduced likelihood of willingness to agree to kill for more intelligent individuals and a pronounced moral transgression effect for less intelligent individuals in the market environment. Possibly, individuals with a higher fluid intelligence can better understand principles of markets and how these may facilitate acting in immoral, selfish ways (e.g., via diffusion of responsibility, social information, and shared guilt). Being aware of such market mechanisms may make it easier to resist the temptations markets provide. For example, understanding that one may tend to focus on prices and profits in markets (Vohs et al. 2006) or that markets provide social information that may render it easier to behave immorally as well could be key to behave in a more reflected way and stay moral.[17]

With exception of fluid intelligence, none of the other characteristics that proved to correlate with moral behavior in the individual decision context turned out to protect significantly (on average) against moral decay in the market environments. This shows that markets can be very powerful tools causing moral transgression. Besides a high capacity in thinking logically and solving problems in novel situations as measured by the fluid intelligence score, we cannot identify any factor that helps to resist the influences of market trading. Females get equally seduced as males, individuals with siblings equally react as single children. Neither religiousness nor vegetarianism specifically help to overcome the market forces.

[17] For the impact of social information on social behavior, see, e.g., Weber et al. (2004).

5. Concluding remarks

Understanding determinants of morality is of central importance for the social sciences and for society as a whole. We identify in a real task individual differences as well as the institutional set-up as fundamental determinates of moral decision-making. Several characteristics, such as having siblings, a high crystallized or fluid intelligence, religiousness or being female, help staying moral in a real moral decision context. These characteristics contribute to higher moral standards – in individual decision-making and in market environments. Therefore, our data suggest that a comparatively moral personality, a homo moralis, exists.

Markets causally erode moral behavior, affecting many kinds of personalities to severe extents. This informs models of how institutions affect moral decision making: Populations display heterogeneous moral attitudes, but institutions can causally impact moral standards of most participants (Rothenhäusler et al. 2015). The fact that a high capacity in solving problems and thinking logically helps to partly overcome market forces may suggest that policy intervention or customer protection could try to make market mechanisms more transparent. For example, trading clothes, jewelry or electronics possibly involving the suffering of workers may be much easier seeing other people trading the same items, or if they know that others agree to the trade as well. Understanding that such social information can impact moral behavior could be a first step to overcome morally problematic effects of markets.

It is also important to explore other contexts and trade-offs involving moral outcomes in order to gain a broader picture. Results may also vary depending on what kind of moral item is traded. Our study shows that market trading has the potential to reduce moral behavior in many different kinds of people. Social debate is necessary to decide whether we want to live in societies that expose individuals on a large scale to settings that make them reduce their moral standards -- or whether we need some form of protection or more transparency about such mechanisms. With regard to the omnipresence of markets as potential sources of seduction into naïve selfishness, the topic seems rather pressing.

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Appendix

A1: Average Marginal Effects after Probit

Given the following model including interaction terms

$$E[y|x_j, d] = Prob(y = 1|x_j, d) = \Phi\left(\beta_0 + \beta_{treat}\, d + \sum_{j=1}^{k} \beta_j x_j + \sum_{j=1}^{k} \beta_{treat*j}\, d\, x_j\right) = \Phi(A)$$

where y is the binary outcome (Immorality: Agreeing to kill the mouse for 10 euros (or less) vs. not willing to kill), x_j with $j = 1, \ldots, k$ are the individual specific variables, t is a treatment dummy indicating market vs. individual treatment and $\Phi(A)$ is the standard normal cumulative distribution function. To explore whether the effect of institutions on moral behavior is differs for individuals with certain characteristics we are interested in the interaction effects:

$$\frac{\partial(\Delta E[y|x_j, d]/\Delta d}{\partial x_j} = \frac{\Delta(\partial E[y|x_j, d]/\partial x_j}{\Delta d} = \left(\beta_j + \beta_{treat*j}\right)\Phi'(A|d = 1) - \beta_j \Phi'(A|d = 0).$$

These can easily be calculated as differences in the marginal effects of the respective variables conditional on the market dummy being one, minus the marginal effects conditional on the dummy being zero[18]. The marginal effects and thereby the interaction effects depend on the individuals' levels of all explanatory variables. Since we are interested in the general mechanism we focus on average interaction effects which are calculated by differences in average marginal effects. Estimation results are displayed in Table 4.

[18] Estimations can easily be performed with standard statistical software, as e.g. Stata 13, in form of testing linear combinations of coefficients.

Additional Tables and Graphs

Average Marginal Effects Probit	Immorality (0/1)					
	(1)	(2)	(3)	(4)	(5)	(6)
Openness to Experience	-0.069***					-0.062**
	(0.027)					(0.027)
Conscientiousness		0.039				0.038
		(0.027)				(0.027)
Extraversion			-0.001			0.023
			(0.027)			(0.029)
Agreeableness				-0.106***		-0.117***
				(0.028)		(0.029)
Neuroticism					-0.033	-0.028
					(0.027)	(0.029)
Treatment dummies	Yes	Yes	Yes	Yes	Yes	Yes
Log likelihood	-198.92	-201.15	-202.14	-194.25	-201.42	-188.79
Observations	310	310	310	310	310	310

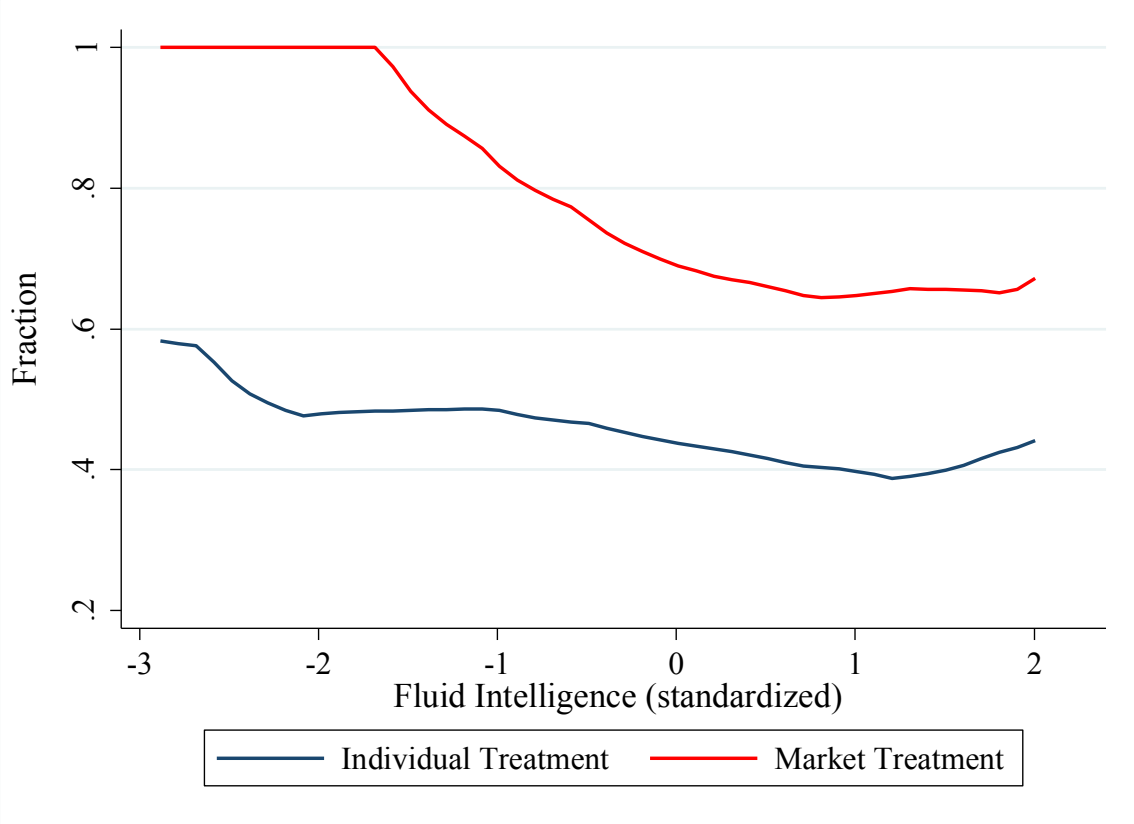
Table A1: Immoral Behavior and the Big Five. Probit regression estimates (marginal effects), with binary outcome (Immorality: Agreeing to kill the mouse for 10 euros (or less) vs. not willing to kill) as dependent variable and standard errors in parentheses. *** indicate significance at the 1-percent-level.

Average Marginal Effects after Probit	Immorality (0/1)		
	(1)	(2)	(3)
IQ score (standardized)	-0.091***	-0.108***	-0.110***
	(0.035)	(0.034)	(0.034)
Male	0.169**	0.128*	0.134**
	(0.066)	(0.066)	(0.067)
Age (in years)	0.005	0.006	0.006
	(0.009)	(0.009)	(0.009)
Single child	0.154*	0.120	0.119
	(0.091)	(0.090)	(0.090)
Religiousness (standardized)		-0.066**	-0.068**
		(0.032)	(0.032)
Vegetarian		-0.246***	-0.249***
		(0.094)	(0.093)
Treatment dummies	Yes	Yes	Yes
Additional controls	No	No	Yes
Log likelihood	-144.48	-140.37	-140.11
Observations	220	220	220

Table A2: Individual differences in moral decision-making (only individual treatments). Probit regression estimates (marginal effects), with binary outcome (Immorality: Agreeing to kill the mouse for 10 euros (or less) vs. not willing to kill) as dependent variable and robust standard errors in parentheses. ***, **, * indicate significance at the 1-percent, 5-percent and 10-percent-level, respectively. Additional controls in column (3) include disposable income, having a pet and being exposed to animal experiments.

Average Marginal Effects after Probit	Immorality (0/1)			
	(1)	(2)	(3)	(4)
Fluid intelligence (standardized)	-0.069***	-0.089***		
	(0.026)	(0.026)		
Crystallized intelligence (standardized)			-0.070**	-0.075**
			(0.031)	(0.029)
Male	0.157***	0.122**	0.134**	0.098*
	(0.054)	(0.054)	(0.054)	(0.054)
Age (in years)	0.006	0.006	0.009	0.009
	(0.008)	(0.008)	(0.008)	(0.008)
Single child	0.179***	0.157**	0.187***	0.171**
	(0.069)	(0.067)	(0.068)	(0.067)
Religiousness (standardized)		-0.065**		-0.058**
		(0.027)		(0.027)
Vegetarian		-0.253***		-0.217**
		(0.080)		(0.085)
Treatment dummies	Yes	Yes	Yes	Yes
Log likelihood	-192.44	-186.19	-192.92	-188.12
Observations	310	310	310	310

Table A3: Individual differences in moral decision-making (focusing on fluid and crystalized intelligence). Probit regression estimates (marginal effects), with binary outcome (Immorality: Agreeing to kill the mouse for 10 euros (or less) vs. not willing to kill) as dependent variable and robust standard errors in parentheses. ***, **, * indicate significance at the 1-percent, 5-percent and 10-percent-level, respectively.



Graph A1: Fluid Intelligence and the probability to agree to kill for Individual and Market Treatment. This figure shows kernel-weighted local polynomial regressions using local-mean smoothing, Epanechikov kernels and bandwidth selections via the plug-in estimator of the asymptotically optimal constant bandwidth.

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