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# Handedness, Ability, Earnings and Risk Evidence from the Lab*

**Marcello Sartarelli****

## Abstract

The relationship between handedness, ability and, in addition, their joint role in explaining earnings and decisions under risk is studied experimentally to shed new light on the mechanisms behind the mixed evidence in survey data. Data on 432 under graduate students show that left-handed (L) do not obtain a significantly different Cognitive Reflection Test score relative to others nor different payoffs in a stylized labour market with agents working for principals and being paid for exerting costly effort, a proxy for earnings. In addition, they are not significantly more risk averse. In partial contrast, their self-reported achievement at university tends to be significantly higher and driven by females although weakly for some specifications. Finally, when looking at personality traits, measured using the Big Five test, L are significantly more agreeable, showing higher preferences for cooperation, and also tend to be more extroverted, in particular more sociable.

**Keywords:** Ability, Big Five, CRT, earnings, gender, handedness, leftie, left-handed, personality traits, risk.

**JEL classification numbers:** C91, D81, D87.

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# 1 Introduction

Although only about 10% of people are left-handed (L) (McManus, 2009), handedness has been widely studied to gain a better understanding of its determinants in science and of its behavioural impact in social science. L tend to exhibit better information processing and communication thanks to a thicker corpus callosum, a flat bundle of neural fibers connecting the brain left and right hemispheres (Witelson, 1985; Habib *et al.*, 1991; Hines *et al.*, 1992).[1] However, evidence on the genetic determinants of handedness is not conclusive, as suggested by negligible differences found in twins by zygosity (Medland *et al.*, 2009; Vuoksimaa *et al.*, 2009) and in brain hemispheres asymmetry in grey and white matter (Good *et al.*, 2001).[2]

Evidence on cognitive ability is mixed for children. Being L is associated to better school performance and leadership skills for boys and worse ones for girls in a survey with 1,700 primary school children in France (Faurie *et al.*, 2006) and in a longitudinal study of about 5,000 children aged 4-5 in Australia (Johnston *et al.*, 2007). However, it is also associated with worse learning, cognitive, social and language skills, driven by boys, for children aged about 13 in a large and representative survey in the US (Johnston *et al.*, 2010).[3]

For adults, evidence from surveys representative of the population is also mixed. In the UK working-age L females earn about 8% less while men earn 8% more (Denny and Sullivan, 2007). Among young adults in the US, aged 28-35, L males who completed extra years of education obtain 15% higher wages (Ruebeck *et al.*, 2007).

[1] Corpus callosum (CC) is about 10 cm long and located below the brain cortex. Difference in CC by handedness seems to be greater for men (Witelson and Goldsmith, 1991). No difference in CC size is observed, instead, in adults relative to children, while CC size slightly decreases in old age (Driesen and Raz, 1995).

[2] The percentage of L increased from about 2% in 1900 to about 10% in 2000 in developed economies, being slightly higher for men, while it is lower in developing economies where L tend to be forced to use the right hand (McManus, 2002, 2009). It is also slightly higher among twins (Vuoksimaa *et al.*, 2009) and among prematurely born children (Witelson and Nowakowski, 1991). Among L, concordance for writing and throwing is 2-4 times higher than discordance (Gilbert and Wysocki, 1992). Additional evidence in support of the hypothesis that handedness is at least partially due to genetics shows differences in genes weakly linked to neuro-developmental disorders (Francks *et al.*, 2007; Brandler *et al.*, 2013; Armour *et al.*, 2014; Brandler and Paracchini, 2014), although competing evidence shows that several genes can explain the relationship (McManus *et al.*, 2013; Armour *et al.*, 2014). Differences in prenatal thumb sucking are also observed and tend to be driven by men (Hepper *et al.*, 2005).

[3] Earlier studies also show mixed evidence, some finding that L children have lower ability (Hardyck and Petrinovich, 1977; Porac and Coren, 1981) while others higher (McManus and Bryden, 1991) or no significant difference (Hardyck *et al.*, 1976).

Finally, comparable evidence on young adults in the UK and the US shows that L earn 10% less, are more frequently in low-skill jobs, with little gender difference, and, in addition, have lower cognitive skills and more behavioral and learning problems (Goodman, 2014). Overall, survey evidence suggests that L are somewhat worse off in the labour market. However, little is known about whether the nature of the underlying mechanisms is predominantly behavioural, cognitive or psychological.[4]

Since survey evidence can be subject to measurement error and omitted variables bias, in this paper we complement it with clean experimental one by borrowing data on earnings obtained in the stylised labour market with multiple principals and agents, on decisions under risk and from the rich questionnaire in Ponti *et al.* (2016) to answer the following questions.

- $Q_1$: Do L have lower ability or earn less, potentially driven by gender?
- $Q_2$: Is the relationship in $Q_1$ explained by risk aversion?
- $Q_3$: Are results in $Q_1$ and $Q_2$ rationalisable by personality differences?

$Q_1$ sets out to test whether a hypothesis that has been found to hold in survey data is confirmed when using experimental data on undergraduate students, i.e. young adults. $Q_2$ aims to shed light on whether risk is a mechanism that helps rationalising potential earnings differences by handedness. It also contributes with novel experimental evidence on the role of handedness, a predetermined characteristic so far overlooked in experiments, in individuals' decisions. Finally, $Q_3$ tests whether personality differences are helpful to rationalise answers to $Q_1$ and $Q_2$, as well as contributing to the recent experimental literature studying the relationship between individuals' personality and decision theory (Rustichini *et al.*, 2012; Burks *et al.*, 2014; Cubel *et al.*, 2016).[5]

For the 432 subjects in Ponti *et al.* (2016) we use data on their earnings in a stylised labour market with agents' earnings depending on whether they put costly

[4]Differences by handedness in neural activity associated with motivation (Brookshire and Casasanto, 2012; Casasanto and Henetz, 2012) offer support to the complex relationship between handedness, genetic factors and behavioural ones.

[5]Survey evidence shows that labour market performance varies with cognitive and non-cognitive ability (see for a review Heckman and Kautz, 2012) and, in addition, with risk attitudes using data representative of the population (Guiso *et al.*, 2002; Dohmen *et al.*, 2011) and using data on truck drivers (MacCrimmon and Wehrung, 1990) and on executives (Burks *et al.*, 2009). However, surveys tend to measure risk aversion imprecisely, by using few and non-incentivised decisions, and, in addition, lack data on handedness.

effort, while principals earn residual profits that increase with the number of agents working for them and putting effort. We also use data on decisions under risk, shown as a multiple price list, for 240 subjects, as risk preferences were not elicited in all experimental sessions. From the debriefing questionnaire we obtain measures of cognitive ability using the Cognitive Reflection Test (CRT) in Frederick (2005), of cognitive and non-cognitive ability using self-reported grade point average (GPA) and of personality traits from the Big Five (John *et al.*, 1991).

We find that L do not obtain a significantly different CRT score from others and that handedness is balanced by gender. Students' GPA, a joint measure of cognitive and non-cognitive ability, tends to be significantly higher for L (29-43% s.d.), although weakly in some specifications and with significance being higher for females ($Q_1$-$Q_2$). When using experiment payoffs as a proxy for labour market performance, we find that L obtain slightly higher payoff although the difference is never significant, while they are significantly higher if CRT>0, i.e. above the median value ($Q_1$). When moving to decisions under risk, L are not significantly more risk averse, measured with a dummy or the number of safe choices ($Q_2$). Finally, evidence from the Big Five shows that L are significantly more agreeable, by exhibiting higher preferences for cooperation, and also tend to be more extraverted, by being more sociable ($Q_3$).

Testing experimentally the joint role of handedness, cognitive ability, as well as gender, on achievement at university and on payoffs in a stylised labour market speaks to the non-experimental literature studying the relationship between being L and labour market earnings. Finding that L have higher non-cognitive ability, proxied by GPA and by higher scores in personality traits related to social interactions, highlights the importance of focusing on the complex interaction between individuals' predetermined characteristics and psychological traits to rationalise, at least partially, the mixed evidence between L and labour market performance.

In addition, finding that L does not explain variation in cognitive ability nor in decisions under risk while it explains proxies for non-cognitive ability contributes to the experimental economics literature by highlighting the relevance of accounting for handedness to explain decisions in experiments in which interactions with other players are salient. In decisions free from interactions, such as simple lotteries, being

L seems to, instead, play a little relevant role.

The structure of the rest of the paper is as follows. Section 2 describes the experimental design, section 3 the results of the empirical analysis and, finally, section 4 discusses results and concludes. Experimental instructions, along with additional results, are available in the Appendix.

# 2 Data and methods

In this paper we borrow a subset of the rich experimental data obtained to study in Ponti *et al.* (2016) the determinants and monetary consequences of endogenising principals selection in a setting with multiple principals and agents, i.e. a stylised labour market. From phase 3 in the Ponti *et al.* (2016) we use data on earnings obtained by 432 subjects interacting in the labour market and from phase 0 on decisions under risk shown as a multiple price list (MPL) by 240 subjects, with the number of subjects being lower than in phase 3 as risk preferences were not elicited in all experimental sessions. We also use data from the debriefing questionnaire administered at the end of the experiment. Students from the Universidad de Alicante were recruited to participate in the experiment using ORSEE (Greiner, 2004). Experimental sessions were carried out at the Laboratory of Theoretical and Experimental Economics (LaTEx), using z-Tree (Fischbacher, 2007), in 2013, 2014 and 2015.[6]

Earnings were obtained in the stylised labour market in phase 3 in Ponti *et al.* (2016) as follows. Firstly subjects choose whether being agents or principals, with principals competing to hire agents by offering payoffs for agents, i.e. 2x2 effort games to mimic contracts for pairs of agents, and agents, who are paired randomly, choosing a contract. Principals' payoffs increase in the number of agents' pairs putting effort while agents' payoffs are higher if at least one in a pair, or both, put effort. 24 players divided in 2 cohorts of 12 played this phase, which was repeated over 24 periods, in each experimental session.

Subjects' risk preferences were elicited by means of a Multiple Price List (MPL) protocol consisting of a sequence of 21 binary decisions, in phase 0 in the experiment. Option A is a sure payment whose value increases along the decisions sequence in

[6]More information about LaTEx is available in http://fae.ua.es/FAEX/latex/.

steps of 50 pesetas from 0 to 1000 and option B is a 50/50 chance to win 1000 pesetas, constant along the sequence. One of the decisions is selected randomly for payment at the end of the experiment.[7]

All monetary payoffs in the experiment were expressed in Spanish pesetas with an exchange rate of 166 pesetas for 1 euro. The final payoffs for each subject were calculated as the sum of the payoffs in the four phases in Ponti *et al.* (2016). Subjects earned on average 20 euros for an experimental session that lasted, all included, about 2 hours. Additional details are about the experimental design are available in Section 2 in Ponti *et al.* (2016).[8]

Subjects' consistency in MPL choices is defined in Cueva *et al.* (2015) as preferring a lottery with a 50/50 chance of earning 1000 pesetas in decision 1, as it is greater than a sure payment of 0, to then switch to the sure payment along the sequence only once. Risk aversion is defined by using two proxies. The first is a dummy equal to 1 if a subject switches from the lottery to the sure payment before decision 11, when the lottery expected value and the sure payment are both equal to 500 pesetas. The second, instead, is the number of decisions in which a sure payment is preferred ranging from 1 to 21, i.e. the number of safe choices. While this continuous measure is meant to capture the curvature of CRRA utility function, the binary measure offers a qualitative assessment of risk aversion.[9] Although the distribution of safe choices for consistent and inconsistent subjects is significantly different, with a Kolmogorov-Smirnov test p-value of 0.0001, proxies for risk aversion are defined using data on consistent and also on inconsistent subjects to increase the overall number of observations in the empirical analysis.

[7]The user interface used in the risk preferences elicitation task and the instructions are shown in Appendix A. Our MPL protocol follows the structure of the one in Holt and Laury (2002), with two lotteries in which payoffs vary across lotteries but are fixed along the sequence and probabilities vary along the sequence. However, we replaced one of the two lotteries with a certain payment, i.e. a degenerate lottery, whose value increases along the sequence, to obtain information about subjects' utility on a broader interval of payoff values.

[8]It is standard practice, for all experiments ran at LaTEx, to use Spanish pesetas as experimental currency. The reason for this design choice is twofold. First, it mitigates integer problems, compared with, for example, US dollars or euros. Although Spanish pesetas were replaced by euros in 2002, they are still used to express monetary values in everyday life with, for example, several supermarkets displaying prices in both currencies. Second, by using a real, as opposed to an artificial currency, we avoid the problem of framing the incentive structure of the experiment using a scale with no cognitive content.

[9]A similar binary measure of risk aversion is proposed to explain a variety of relevant decisions, such as occupation or stockholding in a representative household survey in Italy (Guiso and Paiella, 2005).

From the debriefing questionnaire we use a dummy equal to 1 if a subject is female and a dummy equal to 1 if a subject is left-handed (L). We also use, as cognitive ability measure, the CRT score, taking as values integers in the interval 0-3 and a dummy equal to 1 if the CRT score is greater than 0, the median value. Since the support of the CRT score is only integers and in a very small interval, using in regressions a dummy to measure if the CRT score is greater than the median value simplifies results interpretation.[10] In addition, as a measure of cognitive and non-cognitive ability, we use the GPA over all exams taken in a degree by a subject at the time of the experiment.[11]

Finally, we use data from a reduced version of the Big Five to obtain measures of the following personality traits: agreeableness, conscientiousness, extraversion, neuroticism and openness. Each variable measuring a trait takes integer or decimal values between 1, the lowest value, and 7, the highest, and is constructed as a mean of scores in Big Five questions on that trait, with each question taking only integer values in the range 1-7 (John *et al.*, 1991, 2008). We also use the short index, that is obtained using 10 questions on different traits and is shown to be correlated with the Big Five traits (Rammstedt and John, 2007).[12]

Summary statistics of the variables used in the empirical analysis are shown in Table 1. 8% of individuals are L in the data, a figure not substantially different from 10% in the population. The data is also close to being gender-balanced, with 48% females. The mean of the CRT score shows that on average subjects answer correctly fewer than one out of the three questions in the CRT and that 0 is the median value. Hence, we define a dummy I(CRT$>$ 0) equal to 1 if at least one answer is correct and 0 otherwise to measure the percentage of subjects with at least one right answer, that is about 40% as shown in the table.[13] As for subject's

[10]The order in which the 3 CRT questions are presented is always the same, as in Frederick (2005). In addition, the test was not incentivised.

[11]In section B.2 in Appendix B we discuss estimates of regressions of the relationship between GPA and L also controlling for the fact that GPA was recorded at the time of the experiment.

[12]Data on individual questions used to obtain Big Five indices is shown in section B.2 Appendix B.

[13]Table B.1 in Appendix B shows that about 20% of subjects answer correctly more than 1 question in the CRT and only 10% more than 2 questions.

Table 1: Summary statistics

| | Mean | Median | Std. dev. | Min | Max | N. obs.s |
|---|---|---|---|---|---|---|
| Left-handed | 0.081 | . | 0.273 | 0.000 | 1.000 | 432 |
| Female | 0.479 | . | 0.500 | 0.000 | 1.000 | 432 |
| CRT score | 0.699 | 0.000 | 0.986 | 0.000 | 3.000 | 432 |
| $I(CRT > 0)$ | 0.396 | . | 0.490 | 0.000 | 1.000 | 432 |
| GPA | 6.842 | 7.000 | 0.903 | 4.000 | 9.200 | 432 |
| Experiment payoff (euros) | 6.434 | 6.445 | 4.938 | 0.000 | 19.887 | 432 |
| *Decisions under risk (MPL)* | | | | | | |
| Consistent | 0.792 | . | 0.407 | 0.000 | 1.000 | 240 |
| Risk averse | 0.521 | . | 0.501 | 0.000 | 1.000 | 240 |
| N. safe choices | 12.783 | 12.000 | 4.616 | 0.000 | 21.000 | 240 |
| *Big Five indices* | | | | | | |
| Agreeableness | 4.852 | 4.800 | 0.645 | 2.400 | 6.400 | 432 |
| Conscientiousness | 5.418 | 5.600 | 0.903 | 2.000 | 7.200 | 432 |
| Extraversion | 4.619 | 4.600 | 1.282 | 1.200 | 7.000 | 432 |
| Neuroticism | 3.931 | 3.833 | 1.201 | 1.000 | 7.000 | 432 |
| Openness | 5.482 | 5.571 | 0.849 | 2.143 | 7.143 | 432 |
| Short | 4.756 | 4.800 | 0.656 | 2.600 | 6.300 | 432 |

GPA, it is about 6.8 out of 10 with a standard deviation close to unity while the mean payoff in the stylised labour market in Ponti *et al.* (2016) is about 6.4 euros with a standard deviation of about 5 euros.

When we move on to look at risk attitudes, Table 1 shows that 79% of subjects are consistent in MPL choices, that about 52% are risk averse, using a binary proxy, and that on average the sure payment was chosen in about 13 out 21 choices, with a standard deviation of about about 4.6. The number of observations for MPL data is smaller than for other variables as risk preferences were not elicited in all experimental sessions, as shown in the last column on the right-hand in the table.[14] Finally, the bottom part of Table 1 shows summary statistics of Big Five indices. Their mean values range approximately between 3.9 for neuroticism and 5.48 for openness and are in line with median values, suggesting that distributions tend to be centered at the mean. Their standard deviations also varies, between 0.65 for agreeableness and 1.3 for extraversion.

Table 2 shows correlations among outcomes and explanatory variables used in the empirical analysis. The first column on the left-hand side shows that no variable is significantly correlated with being L. The second column shows that females have a significantly lower CRT, measured both as the number of right answers and as a dummy equal to 1 if the number of answers is greater than the median, I(CRT$>0$), in line with evidence in the related literature (see for a literature review Brañas-Garza *et al.*, 2015; Cueva *et al.*, 2015). Females also score significantly higher in the Big Five conscientiousness index and neuroticism while weakly lower in openness.The third and fourth column show a positive and significant correlation between the CRT and experiment payoffs, a positive one with consistency in decisions under risk and a negative one with proxies for risk aversion. CRT is also negatively and significantly correlated with neuroticism and positively with openness.

In addition, Table 2 shows that GPA is positively and highly significantly correlated with conscientiousness and openness indices. The experimental payoff is also significantly correlated with these indices and, in addition, with openness although

[14]The percentage of L by gender and also by CRT score is similar to the figure for the full data sample, as shown in Table B.1 in Appendix B.

## Table 2: Correlations

| | L | F | CRT | $I(CRT > 0)$ | GPA | Exp. payoff | MPL CO | RA | SC | Big Five indices AGR | CON | EXT | NEU | OPE | SH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Left-handed (L) | 1.00 | | | | | | | | | | | | | | |
| Female (F) | 0.004 | 1.000 | | | | | | | | | | | | | |
| CRT | -0.030 | -0.220*** | 1.000 | | | | | | | | | | | | |
| $I(CRT > 0)$ | -0.015 | -0.236*** | 0.877*** | 1.000 | | | | | | | | | | | |
| GPA | 0.079 | 0.016 | 0.064 | 0.078 | 1.000 | | | | | | | | | | |
| Experiment payoff | 0.031 | -0.008 | 0.091* | 0.164*** | 0.023 | 1.000 | | | | | | | | | |
| MPL consistent (CO) | -0.031 | -0.183*** | 0.244*** | 0.249*** | -0.058 | 0.105 | 1.000 | | | | | | | | |
| MPL risk averse (RA) | 0.018 | 0.104 | -0.110* | -0.170*** | -0.012 | 0.024 | -0.430*** | 1.000 | | | | | | | |
| MPL n. safe choices (SC) | -0.005 | 0.080 | -0.194*** | -0.255*** | -0.014 | 0.066 | -0.570*** | 0.786*** | 1.000 | | | | | | |
| Big Five AGReeableness | 0.068 | 0.066 | -0.023 | -0.069 | 0.031 | 0.034 | -0.164** | 0.103 | 0.109* | 1.000 | | | | | |
| Big Five CONscientiousness | 0.026 | 0.095** | -0.072 | -0.053 | 0.240*** | 0.091* | -0.056 | 0.033 | 0.071 | 0.329*** | 1.000 | | | | |
| Big Five EXTraversion | 0.045 | -0.060 | -0.070 | -0.067 | -0.033 | 0.092* | 0.118* | -0.059 | -0.009 | 0.150*** | 0.120** | 1.000 | | | |
| Big Five NEUroticism | 0.000 | 0.255*** | -0.192*** | -0.154*** | 0.072 | 0.023 | -0.068 | 0.048 | 0.069 | -0.176*** | 0.040 | -0.017 | 1.000 | | |
| Big Five OPEnness | 0.023 | -0.081* | 0.124** | 0.110** | 0.153*** | 0.093* | 0.115* | -0.123* | -0.095 | 0.210*** | 0.318*** | 0.245*** | -0.019 | 1.000 | |
| Big Five SHort | 0.052 | 0.110** | -0.137*** | -0.119** | 0.115** | 0.185*** | 0.010 | -0.054 | 0.030 | 0.350*** | 0.505*** | 0.483*** | 0.396*** | 0.490*** | 1.000 |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

weakly. As for decisions under risk, the correlation with consistency is negative and highly significant for risk aversion and for agreeableness, while it is positive and weakly significant with extraversion and openness. As for the correlation with risk aversion, if it is proxied using a dummy a negative and weakly significant one with openness is shown while when it is proxied using the number of safe choices, a positive and weakly significant one with agreeableness is shown. Finally, the table shows that Big Five indices are significantly positively correlated such as, for example, agreeableness, extraversion and openness, while agreeableness and neuroticism are significantly negatively correlated.[15]

# 3 Results

In section 3.1 we firstly describe estimates of the relationship between handedness, ability and gender, our explanatory variables, and then their joint role in explaining earnings. In addition, in section 3.2 we describe results of the relationship between risk and our explanatory variables. Finally, in section 3.3 we use data from the Big Five personality test to interpret earlier results. In all regressions, robust standard errors were used.

## 3.1 Ability and earnings

Table 3 shows regression estimates of a dummy equal to 1 if CRT>0, I(CRT>0), on the dummy equal to 1 for L and an additional dummy equal to 1 for females (F). Estimates show that the probability that CRT>0 is small and not significantly different for L (7-13% of the mean value for I(CRT>0), hereafter mean), it is significantly lower for females (55-58% mean) although the female effect is not different for L, as the non-significant estimates of the interaction between L and female dummies shows.[16]

Table 4 shows on left-hand side estimates using GPA as outcome. Being L weakly increases GPA (29-43% of GPA standard deviation, hereafter s.d.) and

[15]Correlations between our main outcomes of interest and questions used to obtain Big Five indices are shown in Table B.6 in Appendix B.

[16]Using as outcome the CRT score in an ordered logit regression, as in Cueva *et al.* (2015), leads to similar results, as shown in Table B.2 in Appendix B.

Table 3: Dummy I(CRT>0), handedness and gender

| | | | |
|---|---|---|---|
| L | -0.027 | -0.025 | 0.053 |
| | (0.085) | (0.080) | (0.123) |
| F | | -0.231*** | -0.218*** |
| | | (0.046) | (0.048) |
| L*F | | | -0.161 |
| | | | (0.157) |
| Constant | 0.398*** | 0.509*** | 0.502*** |
| | (0.025) | (0.034) | (0.035) |
| Observations | 432 | 432 | 432 |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

it is mainly driven by females, as shown by more significant estimates for females subsample in the bottom part of the table. Subsample estimates also show that GPA is weakly significantly higher for L females when not accounting for the interaction between L and CRT dummies. When doing so, instead, the L effect becomes more significant while the point estimate does not changes substantially. In addition, GPA is significantly lower for L females with CRT>0 but not for males, although this result needs to be interpreted cautiously as it is based on 3 observations for L with CRT>0, as shown in Table B.1 in Appendix B. Finally, GPA is higher if CRT>0 and weakly significantly for some but not for all specifications. This relationship suggests that although GPA is self-reported it is positively related to a precise measure of cognitive ability.[17]

The right-hand side panel in Table 4 shows estimates using as outcome payoffs in the stylised labour market experiment in Ponti *et al.* (2016). While payoffs are slightly higher for L (7-12% s.d.), estimates are not significant. They are, instead, highly significantly higher if CRT>0 (33-54% s.d.). This result is driven by males, as shown by the negative and significant coefficient associated to the interaction between the dummies for female and CRT>0, as well as by significant estimates of the CRT dummy in subsample estimates for males in the bottom part of the table.[18]

## 3.2 Risk

Table 5 shows regressions of a dummy equal to 1 if a subject is consistent in MPL choices, defined as switching from the lottery option to the sure payment one only once in the sequence of 21 decisions. Estimates show that the difference by handedness is small (0.1-17% mean) and not significant. Subjects with CRT>0 are consistent significantly more frequently (18-28% mean) while, in contrast, females are significantly less (13-20% mean). Although consistency is significantly lower among females, subsample estimates by gender in the bottom of part of the table show that it is significantly higher for females with CRT>0 and also for males.

[17] Table B.3 in Appendix B shows that estimates of GPA regressions are unchanged after adding degree year dummies, to control for the fact that GPA was recorded at the time of the experiment.

[18] Estimates using as outcomes payoffs in the remaining phases in the Ponti *et al.* (2016) experiment are shown in Table B.4 in Appendix B.

Table 4: Degree GPA and stylised labour market payoffs in Ponti *et al.* (2016)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Full sample regressions* | | | | | | | | | | | |
| | Degree GPA | | | | | | Payoffs in phase 3 | | | | | |
| L | 0.262$^{*}$ | | 0.266$^{*}$ | 0.388$^{*}$ | 0.384$^{*}$ | 0.130 | 0.569 | | 0.613 | 0.575 | 0.554 | 0.340 |
| | (0.153) | | (0.154) | (0.219) | (0.218) | (0.394) | (0.823) | | (0.811) | (0.993) | (0.991) | (1.601) |
| CRT | | 0.144 | 0.146 | 0.172$^{*}$ | 0.186$^{*}$ | 0.172 | | 1.652$^{***}$ | 1.657$^{***}$ | 1.649$^{***}$ | 1.722$^{***}$ | 2.662$^{***}$ |
| | | (0.089) | (0.089) | (0.094) | (0.095) | (0.127) | | (0.485) | (0.485) | (0.509) | (0.516) | (0.685) |
| L*C | | | | -0.328 | -0.317 | -0.014 | | | | 0.101 | 0.158 | -0.602 |
| | | | | (0.283) | (0.284) | (0.456) | | | | (1.713) | (1.706) | (2.370) |
| F | | | | | 0.061 | 0.036 | | | | | 0.320 | 1.068$^{*}$ |
| | | | | | (0.088) | (0.114) | | | | | (0.477) | (0.624) |
| L*F | | | | | | 0.401 | | | | | | 0.257 |
| | | | | | | (0.468) | | | | | | (2.036) |
| F*C | | | | | | 0.025 | | | | | | -2.253$^{**}$ |
| | | | | | | (0.192) | | | | | | (1.036) |
| L*C*F | | | | | | -0.615 | | | | | | 3.240 |
| | | | | | | (0.547) | | | | | | (3.002) |
| Constant | 6.821$^{***}$ | 6.785$^{***}$ | 6.763$^{***}$ | 6.753$^{***}$ | 6.718$^{***}$ | 6.732$^{***}$ | 6.388$^{***}$ | 5.780$^{***}$ | 5.728$^{***}$ | 5.731$^{***}$ | 5.549$^{***}$ | 5.124$^{***}$ |
| | (0.045) | (0.055) | (0.056) | (0.057) | (0.074) | (0.084) | (0.249) | (0.296) | (0.306) | (0.312) | (0.406) | (0.461) |
| Observations | 432 | 432 | 432 | 432 | 432 | 432 | 432 | 432 | 432 | 432 | 432 | 432 |
| | *Subsample regression by gender* | | | | | | | | | | | |
| | Female | | | Male | | | Female | | | Male | | |
| L | 0.399$^{*}$ | 0.416$^{*}$ | 0.532$^{**}$ | 0.132 | 0.123 | 0.130 | 1.018 | 1.079 | 0.597 | 0.147 | 0.008 | 0.340 |
| | (0.212) | (0.215) | (0.252) | (0.216) | (0.217) | (0.394) | (1.091) | (1.081) | (1.258) | (1.224) | (1.200) | (1.600) |
| CRT | | 0.159 | 0.196 | | 0.171 | 0.172 | | 0.568 | 0.409 | | 2.614$^{***}$ | 2.662$^{***}$ |
| | | (0.137) | (0.144) | | (0.122) | (0.127) | | (0.739) | (0.777) | | (0.654) | (0.685) |
| L*C | | | -0.630$^{**}$ | | | -0.014 | | | 2.638 | | | -0.602 |
| | | | (0.301) | | | (0.456) | | | (1.845) | | | (2.369) |
| Constant | 6.824$^{***}$ | 6.779$^{***}$ | 6.768$^{***}$ | 6.818$^{***}$ | 6.733$^{***}$ | 6.732$^{***}$ | 6.308$^{***}$ | 6.146$^{***}$ | 6.191$^{***}$ | 6.461$^{***}$ | 5.148$^{***}$ | 5.124$^{***}$ |
| | (0.065) | (0.076) | (0.077) | (0.064) | (0.083) | (0.084) | (0.352) | (0.414) | (0.421) | (0.354) | (0.451) | (0.461) |
| Observations | 207 | 207 | 207 | 225 | 225 | 225 | 207 | 207 | 207 | 225 | 225 | 225 |

Table 5: Consistency in MPL choices

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | *Full sample regressions* | | | |
| L | -0.045 | | -0.074 | -0.014 | -0.001 | -0.137 |
| | (0.101) | | (0.101) | (0.151) | (0.153) | (0.282) |
| I(CRT> 0) (C) | | 0.209*** | 0.212*** | 0.223*** | 0.195*** | 0.144** |
| | | (0.047) | (0.046) | (0.047) | (0.048) | (0.060) |
| L*C | | | | -0.123 | -0.146 | -0.061 |
| | | | | (0.200) | (0.204) | (0.323) |
| F | | | | | -0.101* | -0.158** |
| | | | | | (0.054) | (0.075) |
| L*F | | | | | | 0.205 |
| | | | | | | (0.335) |
| F*C | | | | | | 0.123 |
| | | | | | | (0.101) |
| L*C*F | | | | | | 0.079 |
| | | | | | | (0.376) |
| Constant | 0.795*** | 0.713*** | 0.718*** | 0.714*** | 0.771*** | 0.803*** |
| | (0.027) | (0.037) | (0.038) | (0.039) | (0.045) | (0.052) |
| Observations | 240 | 240 | 240 | 240 | 240 | 240 |
| | | | *Subsample regressions by gender* | | | |
| | | Female | | | Male | |
| L | 0.072 | 0.073 | 0.069 | -0.146 | -0.180 | -0.137 |
| | (0.147) | (0.142) | (0.182) | (0.139) | (0.139) | (0.281) |
| C | | 0.269*** | 0.267*** | | 0.140** | 0.144** |
| | | (0.076) | (0.081) | | (0.060) | (0.060) |
| L*C | | | 0.018 | | | -0.061 |
| | | | (0.192) | | | (0.323) |
| Constant | 0.706*** | 0.645*** | 0.646*** | 0.873*** | 0.805*** | 0.803*** |
| | (0.046) | (0.054) | (0.055) | (0.031) | (0.051) | (0.052) |
| Observations | 111 | 111 | 111 | 129 | 129 | 129 |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6 shows on the left-hand side estimates of risk aversion measured using a dummy equal to 1 if a subject switches from the constant lottery to the increasing sure payment along the MPL sequence before the value of the sure payment is at least equal to the expected value of the lottery, which occurs from decision 11 onwards. It tends to be higher for L (6-43% mean) although not significant. It is, instead, significantly lower for subjects with CRT>0 (25-34% mean) although only when not controlling by gender. Instead, when controlling for it, the CRT effect is substantially smaller and loses significance, while it is weakly significantly higher for females (27% mean) and weakly significantly lower for females with a CRT score above the median.[19]

On the right-hand side of Table 6, instead, risk aversion is measured by using the number of safe choices out of 21, i.e. the number of decisions in which a sure payment is preferred to a lottery. Estimates show that it tends to be higher for L (2-32% mean) although not significant while it is significantly lower if CRT>0 (35-53% s.d.). This result is not driven by gender, as the coefficient of the female dummy is not significant and the CRT one is significant for both females and for males in subsample estimates by gender in the bottom part of the table.[20]

### 3.3 Personality

Table 7 shows estimates using as outcomes Big Five indices, which are obtained as a mean of scores over a set of questions dedicated to measure various aspects of agreeableness (AGR), conscientiousness (CON), extraversion (EXT), neuroticism (NEU) and openness (OPE).[21] Estimates on the left-hand side in Panel A show that AGR is significantly higher for L (25-48% s.d.), highly significant for some specifications, and being driven by females, as shown by subsample estimates by gender in the bottom part of the table. In addition, AGR is significantly lower for L with CRT>0 and it is driven by males, as shown by subsample estimates by

[19]While subsample regressions by gender in the bottom part of the table show highly significant estimates for L females with CRT>0, only 3 subjects belong to this group, as shown in Table B.1 in Appendix B, thus suggesting to interpret this result cautiously.

[20]Thanks to a greater sample size it would be valuable to study risk aversion separately for consistent and inconsistent subjects, in future research.

[21]See section 2 for additional details about the construction of Big Five indices.

Table 6: Binary risk aversion measure and number of safe choices in MPL

*Full sample regressions*

| | Binary measure | | | | | | Number of safe choices | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L | 0.032 | | 0.056 | 0.229* | 0.221* | 0.175 | -0.091 | | 0.241 | 0.114 | 0.105 | 1.486 |
| | (0.117) | | (0.109) | (0.134) | (0.134) | (0.284) | (0.957) | | (0.918) | (1.102) | (1.118) | (2.704) |
| I(CRT>0) (C) | | -0.176*** | -0.178*** | -0.146** | -0.132* | -0.036 | | -2.427*** | -2.437*** | -2.461*** | -2.441*** | -1.601** |
| | | (0.066) | (0.066) | (0.070) | (0.073) | (0.093) | | (0.581) | (0.580) | (0.615) | (0.659) | (0.754) |
| L*C | | | | -0.354* | -0.342 | -0.256 | | | | 0.261 | 0.276 | -0.940 |
| | | | | (0.206) | (0.208) | (0.340) | | | | (1.852) | (1.860) | (3.235) |
| F | | | | | 0.053 | 0.141* | | | | | 0.071 | 0.896 |
| | | | | | (0.067) | (0.085) | | | | | (0.637) | (0.803) |
| L*F | | | | | | 0.049 | | | | | | -2.134 |
| | | | | | | (0.319) | | | | | | (2.908) |
| F*C | | | | | | -0.249* | | | | | | -2.127 |
| | | | | | | (0.148) | | | | | | (1.444) |
| L*C*F | | | | | | -0.316 | | | | | | 0.740 |
| | | | | | | (0.383) | | | | | | (3.740) |
| Constant | 0.518*** | 0.587*** | 0.583*** | 0.571*** | 0.542*** | 0.492*** | 12.791*** | 13.693*** | 13.677*** | 13.686*** | 13.646*** | 13.180*** |
| | (0.034) | (0.040) | (0.041) | (0.042) | (0.057) | (0.065) | (0.315) | (0.378) | (0.391) | (0.401) | (0.522) | (0.581) |
| Observations | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 |

*Subsample regressions by gender*

| | Female | | | Male | | | Female | | | Male | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L | 0.098 | 0.097 | 0.224 | -0.020 | -0.007 | 0.175 | -0.680 | -0.692 | -0.647 | 0.411 | 0.818 | 1.486 |
| | (0.166) | (0.137) | (0.146) | (0.158) | (0.159) | (0.284) | (1.060) | (0.897) | (1.072) | (1.514) | (1.482) | (2.701) |
| C | | -0.331*** | -0.285** | | -0.053 | -0.036 | | -3.744*** | -3.728*** | | -1.666** | -1.601** |
| | | (0.109) | (0.115) | | (0.090) | (0.093) | | (1.135) | (1.234) | | (0.731) | (0.753) |
| L*C | | | -0.572*** | | | -0.256 | | | -0.200 | | | -0.940 |
| | | | (0.177) | | | (0.340) | | | (1.879) | | | (3.231) |
| Constant | 0.569*** | 0.643*** | 0.633*** | 0.475*** | 0.500*** | 0.492*** | 13.235*** | 14.080*** | 14.076*** | 12.407*** | 13.212*** | 13.180*** |
| | (0.049) | (0.054) | (0.055) | (0.046) | (0.064) | (0.065) | (0.516) | (0.543) | (0.554) | (0.383) | (0.569) | (0.580) |
| Observations | 111 | 111 | 111 | 129 | 129 | 129 | 111 | 111 | 111 | 129 | 129 | 129 |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

gender. Estimates on the right-hand side in Panel A show that CON, instead, is not significantly different by handedness nor by any other predetermined characterised used as explanatory variable.

Estimates on the left-hand side in Panel B show that EXT is higher for L (4-34% s.d.) although estimates are not significant while it is weakly significantly lower for females (17-24% s.d.). In addition, subsample estimates by gender show that EXT is weakly significantly higher for L females (40-52% s.d.). Estimates on the right-hand side in Panel B show that NEU is not significantly different by handedness, with point estimates having a mixed sign. It also shows that is significantly lower if CRT>0 (20-32% s.d.) although when adding the female dummy the CRT dummy coefficient loses significance and, instead, NEU is highly significantly higher for females (45-46% s.d.). Finally, estimates on the left-hand side in Panel C show that OPE is higher for L (8-32% s.d.) although the difference is not significant. It tends, instead, to be significantly higher if CRT>0 (13-24% s.d.) and it is driven by females, as shown by subsample estimates by gender. Estimates on the right-hand side in Panel C show that the short index, obtained using 10 questions on different traits (Rammstedt and John, 2007), tends to higher for L (19-57% s.d.) although it is only significant once CRT and gender have been accounted for. In addition, it tends to be lower if CRT>0 (13-29% s.d.) although it is not significant for all specifications. When looking at the interaction between L and CRT dummies, estimates show that the index is significantly lower for L with CRT> 0.

Since each of the Big Five personality traits is measured using an index obtained as a mean over all questions about different aspects a given trait, by only focusing on indices rather on individual questions we may overlook informative aspects of a trait. Hence, we also obtained estimates using as outcomes answers to questions used to construct Big Five indices, shown in Tables B.7-B.11 in Appendix B, to gain a better understanding of the psychological mechanisms underlying our results. The main results show that evidence on the positive association between L and agreeableness is driven by preferences for being considerate and kind, particularly for females, and by preferences for cooperation, particularly for men. As for the the

## Table 7: Big Five indices

*Panel A*

*Full sample regressions*

| | Agreeableness | | | | | | Conscientiousness | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L | 0.161* | | 0.158* | 0.311*** | 0.307*** | 0.309** | 0.086 | | 0.083 | 0.166 | 0.156 | 0.281 |
| | (0.091) | | (0.089) | (0.099) | (0.099) | (0.130) | (0.155) | | (0.154) | (0.174) | (0.176) | (0.244) |
| I(CRT>0) (C) | | -0.090 | -0.089 | -0.057 | -0.043 | -0.062 | | -0.098 | -0.097 | -0.079 | -0.044 | -0.123 |
| | | (0.064) | (0.064) | (0.068) | (0.070) | (0.091) | | (0.090) | (0.090) | (0.094) | (0.096) | (0.130) |
| L*C | | | | -0.408** | -0.397** | -0.508** | | | | -0.222 | -0.194 | -0.412 |
| | | | | (0.179) | (0.177) | (0.197) | | | | (0.338) | (0.335) | (0.422) |
| F | | | | | 0.063 | 0.037 | | | | | 0.155* | 0.085 |
| | | | | | (0.065) | (0.086) | | | | | (0.089) | (0.118) |
| L*F | | | | | | -0.001 | | | | | | -0.189 |
| | | | | | | (0.189) | | | | | | (0.339) |
| F*C | | | | | | 0.040 | | | | | | 0.184 |
| | | | | | | (0.145) | | | | | | (0.194) |
| L*C*F | | | | | | 0.478 | | | | | | 0.646 |
| | | | | | | (0.390) | | | | | | (0.615) |
| Constant | 4.839*** | 4.888*** | 4.875*** | 4.862*** | 4.826*** | 4.841*** | 5.411*** | 5.457*** | 5.450*** | 5.443*** | 5.355*** | 5.394*** |
| | (0.033) | (0.040) | (0.041) | (0.042) | (0.057) | (0.066) | (0.045) | (0.055) | (0.057) | (0.058) | (0.079) | (0.092) |
| Observations | 432 | 432 | 432 | 432 | 432 | 432 | 432 | 432 | 432 | 432 | 432 | 432 |

*Subsample regressions by gender*

| | Female | | | Male | | | Female | | | Male | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L | 0.305** | 0.302** | 0.308** | 0.024 | 0.029 | 0.309** | 0.127 | 0.135 | 0.092 | 0.045 | 0.054 | 0.281 |
| | (0.125) | (0.126) | (0.138) | (0.121) | (0.115) | (0.130) | (0.206) | (0.206) | (0.236) | (0.227) | (0.223) | (0.243) |
| C | | -0.024 | -0.022 | | -0.102 | -0.062 | | 0.075 | 0.061 | | -0.156 | -0.123 |
| | | (0.108) | (0.113) | | (0.085) | (0.091) | | (0.138) | (0.144) | | (0.124) | (0.130) |
| L*C | | | -0.030 | | | -0.508** | | | 0.234 | | | -0.412 |
| | | | (0.337) | | | (0.197) | | | (0.448) | | | (0.422) |
| Constant | 4.872*** | 4.878*** | 4.878*** | 4.810*** | 4.861*** | 4.841*** | 5.497*** | 5.475*** | 5.479*** | 5.332*** | 5.411*** | 5.394*** |
| | (0.048) | (0.054) | (0.055) | (0.045) | (0.064) | (0.066) | (0.063) | (0.073) | (0.074) | (0.065) | (0.090) | (0.092) |
| Observations | 207 | 207 | 207 | 225 | 225 | 225 | 207 | 207 | 207 | 225 | 225 | 225 |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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*Panel B*

| | *Full sample regressions* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Extraversion | | | | | | Neuroticism | | | | | |
| L | 0.209 | | 0.205 | 0.420 | 0.434 | 0.046 | 0.002 | | -0.008 | 0.143 | 0.106 | -0.015 |
| | (0.224) | | (0.221) | (0.279) | (0.283) | (0.472) | (0.233) | | (0.226) | (0.280) | (0.270) | (0.340) |
| C | | -0.175 | -0.173 | -0.127 | -0.176 | -0.258 | | -0.378$^{***}$ | -0.378$^{***}$ | -0.346$^{***}$ | -0.221$^{*}$ | -0.245 |
| | | (0.127) | (0.128) | (0.133) | (0.135) | (0.174) | | (0.117) | (0.118) | (0.122) | (0.121) | (0.162) |
| L*C | | | | -0.576 | -0.614 | -0.217 | | | | -0.404 | -0.306 | -0.055 |
| | | | | (0.443) | (0.446) | (0.638) | | | | (0.468) | (0.465) | (0.577) |
| F | | | | | -0.213$^{*}$ | -0.310$^{*}$ | | | | | 0.552$^{***}$ | 0.534$^{***}$ |
| | | | | | (0.125) | (0.160) | | | | | (0.113) | (0.150) |
| L*F | | | | | | 0.621 | | | | | | 0.193 |
| | | | | | | (0.585) | | | | | | (0.509) |
| F*C | | | | | | 0.176 | | | | | | 0.057 |
| | | | | | | (0.275) | | | | | | (0.246) |
| L*C*F | | | | | | -0.620 | | | | | | -0.733 |
| | | | | | | (0.862) | | | | | | (0.853) |
| Constant | 4.602$^{***}$ | 4.688$^{***}$ | 4.671$^{***}$ | 4.653$^{***}$ | 4.774$^{***}$ | 4.829$^{***}$ | 3.931$^{***}$ | 4.081$^{***}$ | 4.082$^{***}$ | 4.069$^{***}$ | 3.755$^{***}$ | 3.765$^{***}$ |
| | (0.064) | (0.078) | (0.080) | (0.081) | (0.102) | (0.114) | (0.060) | (0.073) | (0.075) | (0.076) | (0.098) | (0.113) |
| Observations | 432 | 432 | 432 | 432 | 432 | 432 | 432 | 432 | 432 | 432 | 432 | 432 |

| | *Subsample regressions by gender* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Female | | | Male | | | Female | | | Male | | |
| L | 0.528$^{*}$ | 0.513$^{*}$ | 0.667$^{*}$ | -0.088 | -0.074 | 0.046 | 0.058 | 0.033 | 0.177 | -0.059 | -0.046 | -0.015 |
| | (0.306) | (0.303) | (0.345) | (0.320) | (0.317) | (0.472) | (0.335) | (0.330) | (0.379) | (0.300) | (0.298) | (0.340) |
| C | | -0.132 | -0.082 | | -0.275 | -0.258 | | -0.235 | -0.188 | | -0.249 | -0.245 |
| | | (0.204) | (0.213) | | (0.167) | (0.174) | | (0.178) | (0.185) | | (0.155) | (0.162) |
| L*C | | | -0.837 | | | -0.217 | | | -0.788 | | | -0.055 |
| | | | (0.580) | | | (0.637) | | | (0.629) | | | (0.576) |
| Constant | 4.496$^{***}$ | 4.533$^{***}$ | 4.519$^{***}$ | 4.700$^{***}$ | 4.838$^{***}$ | 4.829$^{***}$ | 4.246$^{***}$ | 4.312$^{***}$ | 4.299$^{***}$ | 3.643$^{***}$ | 3.768$^{***}$ | 3.765$^{***}$ |
| | (0.095) | (0.111) | (0.113) | (0.087) | (0.112) | (0.114) | (0.083) | (0.097) | (0.098) | (0.081) | (0.111) | (0.113) |
| Observations | 207 | 207 | 207 | 225 | 225 | 225 | 207 | 207 | 207 | 225 | 225 | 225 |

$^{*}$ $p < 0.10$, $^{**}$ $p < 0.05$, $^{***}$ $p < 0.01$

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*Panel C*

*Full sample regressions*

| | Openness | | | | | | Short (10 questions) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L | 0.071 | | 0.076 | 0.131 | 0.138 | 0.273 | 0.126 | | 0.122 | 0.352*** | 0.345*** | 0.371*** |
| | (0.118) | | (0.119) | (0.149) | (0.147) | (0.224) | (0.122) | | (0.116) | (0.126) | (0.127) | (0.106) |
| C | | 0.191** | 0.192** | 0.203** | 0.180* | 0.111 | | -0.159** | -0.158** | -0.109 | -0.085 | -0.190** |
| | | (0.083) | (0.084) | (0.089) | (0.092) | (0.119) | | (0.066) | (0.066) | (0.068) | (0.069) | (0.092) |
| L*C | | | | -0.147 | -0.165 | -0.161 | | | | -0.616*** | -0.597*** | -0.570** |
| | | | | (0.245) | (0.241) | (0.307) | | | | (0.229) | (0.230) | (0.226) |
| F | | | | | -0.102 | -0.144 | | | | | 0.106* | 0.018 |
| | | | | | (0.086) | (0.113) | | | | | (0.063) | (0.081) |
| L*F | | | | | | -0.208 | | | | | | -0.033 |
| | | | | | | (0.294) | | | | | | (0.218) |
| F*C | | | | | | 0.175 | | | | | | 0.249* |
| | | | | | | (0.190) | | | | | | (0.138) |
| L*C*F | | | | | | -0.333 | | | | | | -0.124 |
| | | | | | | (0.536) | | | | | | (0.583) |
| Constant | 5.476*** | 5.406*** | 5.400*** | 5.395*** | 5.453*** | 5.477*** | 4.746*** | 4.819*** | 4.809*** | 4.789*** | 4.729*** | 4.779*** |
| | (0.043) | (0.052) | (0.054) | (0.055) | (0.075) | (0.087) | (0.033) | (0.038) | (0.040) | (0.040) | (0.053) | (0.060) |
| Observations | 432 | 432 | 432 | 432 | 432 | 432 | 432 | 432 | 432 | 432 | 432 | 432 |

*Subsample regressions by gender*

| | Female | | | Male | | | Female | | | Male | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L | -0.053 | -0.025 | 0.065 | 0.189 | 0.184 | 0.273 | 0.210 | 0.212 | 0.339* | 0.045 | 0.057 | 0.371*** |
| | (0.172) | (0.176) | (0.190) | (0.153) | (0.154) | (0.224) | (0.189) | (0.191) | (0.191) | (0.149) | (0.135) | (0.106) |
| C | | 0.256* | 0.286* | | 0.098 | 0.111 | | 0.017 | 0.058 | | -0.235*** | -0.190** |
| | | (0.141) | (0.147) | | (0.112) | (0.119) | | (0.104) | (0.103) | | (0.086) | (0.092) |
| L*C | | | -0.494 | | | -0.161 | | | -0.694 | | | -0.570** |
| | | | (0.439) | | | (0.307) | | | (0.537) | | | (0.226) |
| Constant | 5.414*** | 5.341*** | 5.333*** | 5.533*** | 5.484*** | 5.477*** | 4.814*** | 4.809*** | 4.797*** | 4.683*** | 4.801*** | 4.779*** |
| | (0.063) | (0.071) | (0.072) | (0.060) | (0.084) | (0.087) | (0.046) | (0.054) | (0.054) | (0.046) | (0.058) | (0.060) |
| Observations | 207 | 207 | 207 | 225 | 225 | 225 | 207 | 207 | 207 | 225 | 225 | 225 |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

positive association between L and extraversion, it is driven by the tendency to be outgoing and to be little quiet, particularly for females.

# 4 Discussion

Overall, we found that left-handed (L) are gender-balanced, do not obtain a significantly different CRT score, a measure of cognitive ability, nor different payoffs in the Ponti *et al.* (2016) experiment mimicking real-life interactions between multiple principals and agents in a stylised labour market. Self-reported GPA, a measure of cognitive and of non-cognitive ability is, instead, significantly higher for L although weakly in some specifications and it is driven by females ($Q_1$). We also found that neither consistency in decisions under risk nor risk aversion are significantly different for L ($Q_2$). Finally, we found that L tend to be more agreeable and extroverted, driven by females ($Q_3$). Overall, handedness seems little able to explain differences in cognitive ability and in earnings. Differences in achievement at university and in personality traits related to social interactions, instead, point towards a relationship between L, non-cognitive ability and decisions that has not been previously documented to the best of our knowledge.

Our main contribution to the non-experimental literature, in addition to testing in a controlled environment the relationship between L, cognitive ability and earnings obtained in an experimental labour market, is highlighting the relevance of a psychological mechanism in interpreting the existing survey evidence and stimulating further research to shed light on its impact. A possible interpretation for the non-significant earnings difference for L is that in the anonymous interaction in an experimental labour market the significant personality differences related to social interactions we found for L may be relevant although by design less than in a face-to-face relationship in the the real-life one.

While we are aware that experimental data are not representative of the population, data on CRT obtained in the Ponti *et al.* (2016) experiment are in line with population estimates discussed in the meta-analysis in Brañas-Garza *et al.* (2015). Data on earnings are also not representative of the population nor of subjects' productivity in the real-life labour market. However, they are obtained in an experimental task which aims to take to the lab the most salient labour market features, with agents, i.e. employees, being paid to exert costly effort, and principals, i.e. employers, being residual claimants of profits, once agents have been paid.

In addition, data on handedness are in line with population figures. However, handedness is self-reported while a more precise measure accounting for consistency in hand-use across several activities, which has been shown to vary across subjects (Habib *et al.*, 1991; Annett, 2009; Prichard *et al.*, 2013), would be valuable. Finally, we used a reduced version of the Big Five not containing all questions. Although obtaining data on the missing questions may lead to changes in estimates using as outcomes Big Five indices, the evidence on higher preferences for cooperation and higher sociability for L, obtained using individual questions that are used to construct indices, suggest substantial personality differences.

Our paper also contributes to the experimental economics literature studying the determinants of cognitive ability and its consequences on individuals' decisions by highlighting the importance of accounting for handedness, an easy to measure proxy of a predetermined characteristic associated with genetic and behavioural differences. Since handedness shows a low and non-significant correlation with gender and with cognitive ability, they may independently and jointly influence subjects' decisions in directions that are hard to predict ex-ante. This is due, among other factors, to the mixed evidence on the genetic determinants of handedness, to the lack of theory guiding predictions on gender and to the widely documented lower cognitive ability for females (Brañas-Garza *et al.*, 2015; Cueva *et al.*, 2015). Finally, the evidence on personality differences, only significant for traits related to social interactions, suggests that accounting for L in experimental settings in which social interactions play a key role is more relevant than in others with limited interactions. However, a formal test of this conjecture is left for future research.

Additional questions related to the ones answered in this paper have been left for future research as a greater sample size and additional outcomes are required to address them. Firstly, studying the relationship between the predetermined characteristics used in this paper, in particular L, and degree choice would offer a valuable test of whether they contribute to explain the heterogeneity in occupational choice in adulthood that is observed in the literature. In addition, the experimental analysis of occupational choice, i.e. between a role as principal or agent and of subjects' earnings variance rather than just focusing on means, currently in progress in Ponti *et al.* (2016), can shed new light on its determinants, with, as candidates, handedness, gender, ability, personality traits, as well as the exogenously varied institutions in the experiment.

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