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**Giorgio Brunello**

*University of Padua and IZA*

**Piero Esposito**

*University of Cassino and Southern Lazio*

**Lorenzo Rocco**

*University of Padua and IZA*

**Sergio Scicchitano**

*INAPP and John Cabot University of Rome*

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**IZA – Institute of Labor Economics**

Schaumburg-Lippe-Straße 5–9  
53113 Bonn, Germany

Phone: +49-228-3894-0  
Email: [publications@iza.org](mailto:publications@iza.org)

[www.iza.org](http://www.iza.org)

## ABSTRACT

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### **Do Classical Studies Open Your Mind?\***

We investigate whether classical studies in high school – that emphasize in Italy the study of ancient languages such as Latin and Greek - affect personality traits. Using Italian survey data, we compare individuals who did classical studies in high school with similar individuals who completed a more scientific academic curriculum. We find that having done classical studies does not affect conscientiousness and openness but increases neuroticism and self-reported unhappiness.

**JEL Classification:** I21, I26

**Keywords:** school choice, education, classical studies, Big-5, non-cognitive skills, personality traits

**Corresponding author:**

Giorgio Brunello  
Department of Economics and Management  
University of Padua  
via del Santo 33  
35123 Padova  
Italy  
E-mail: [giorgio.brunello@unipd.it](mailto:giorgio.brunello@unipd.it)

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## Highlights

- Classical studies in high school have no effect on conscientiousness and openness
- Those who have completed classical studies are more likely to graduate from college
- Those with a classic education are more neurotic
- People who have a classical education report more unhappiness.

## 1. Introduction

There is an ongoing debate in Italy on the usefulness of classical studies in high school. Why should students spend time trying to master ancient Latin and Greek at the expense of mathematics and science? A popular argument is that the experience develops self-discipline and the ability to work hard. A well known journalist writing for the *Corriere della Sera*, a leading newspaper, writes that "...classical studies are like a bicycle: while you are on it, you struggle and it seems that you are going nowhere. After you finish your ride, however, you discover that now you have the muscles to go anywhere."<sup>1</sup> Supporters of classical studies also argue that by struggling over ancient Latin and Greek young Italians learn to understand others and open their mind to different cultures (Cardinale and Sinigaglia, 2016).

Hard work and self-discipline and openness to others are defining characteristics of conscientiousness and openness, that belong to the Big Five personality traits, together with agreeableness, extraversion and neuroticism. Using survey data that have information on high school curricula and the Big Five, we find little support for the popular arguments in favor of classical studies. We show that these studies in high school do not produce higher conscientiousness and openness when compared to academic school curricula that place a lower emphasis on ancient languages and given more space to mathematics and science. Rather, classical studies are associated with higher neuroticism and self-reported unhappiness.

Our paper is closely related to the literature that looks at the effects of school curricula on individual outcomes. This literature has looked mainly at outcomes such as the likelihood of completing college, the choice of college major and labor

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<sup>1</sup> See [https://www.corriere.it/caffe-gramellini/23\\_febbraio\\_01/vero-classico-83582dba-a1ab-11ed-8104-5554690e695f.shtml](https://www.corriere.it/caffe-gramellini/23_febbraio_01/vero-classico-83582dba-a1ab-11ed-8104-5554690e695f.shtml).

market results (see for instance Cole et al, 2016; Cortes et al. 2015; Goodman 2019; Agarwal et al, 2021). We focus instead on personality traits.

Our work is also related to the literature – mainly European – that explores the economic consequences of secondary school tracks (see, e.g., Brunello and Rocco 2017; Hanushek et al. 2017, Ollikainen et al, 2022). While the focus of this literature is on the pluses and minuses of academic versus vocational education, we present empirical evidence on differences *within* academic education.

## **2. Secondary high schools in Italy**

Italian high school consist of an academic and a vocational track. Compared to the vocational track, the academic track attracts students with higher cognitive ability and with a better parental background (see Agarwal et al. 2021). The academic track comprises mainly the classical lyceum, with its strong emphasis on ancient Latin and Greek, and the scientific lyceum, with little or no Latin and an emphasis on mathematics and sciences.

Within the academic track, the share of students enrolled in the classical lyceum has declined from close to 70 percent in the early 1960s to close to 30 percent in the 2010s,<sup>2</sup> while enrolment in the scientific lyceum has constantly increased, rising doubts not only about the survival of the classical lyceum but also about its usefulness.

## **3. Data**

Our data are drawn from the 2018 wave of the PLUS survey, produced by INAPP, an Italian national research institute. The main objective of this survey is to provide reliable statistical estimates of phenomena that are not covered by other Italian labor market surveys, included the quarterly labor force survey (LFS). For instance, while the LFS collects information on the highest attained degree, PLUS also inquires about educational pathways, which include the completed high school degree. In addition, the 2018 wave has a module on non-cognitive skills,

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<sup>2</sup> Source: Italian Ministry of Education.

that uses the Ten Item Personality Inventory (TIPI) to construct the Big Five personality traits (see Costa and McCrae, 1992).

The TIPI assesses the positive and negative aspects of each Big Five trait with two questions for each category. On a scale of 1 to 7, individuals are asked to rate their perceived level. By inverting the negative component (1=7; 2=6; ...; 7=1) and adding it to the positive component, we aggregate the two measures into a single trait. Each trait has a range of values from a minimum of 2 to a maximum of 14. Table A1 in the online Appendix presents a list of all traits and facets.

#### **4. The Empirical Approach**

Our working sample consists of individuals aged 25 to 64 who have completed either a classical or a scientific lyceum. Since selection into either lyceum is not random, we use entropy balancing to improve the covariate balance between treatment (classical lyceum) and control (scientific lyceum) and make the treatment variable close to being independent of observed background characteristics (see Hainmuller, 2012).

These characteristics are gender, year of birth, detailed maternal and paternal education and occupation, region of birth, the standardized exit score in lower secondary education, self-reported attitudes at age 13, the frequency of kindergarten and the interactions of parental education and occupation with birth in a Southern region.<sup>3</sup> We balance with respect to the mean and the variance of each covariate.

For robustness, we also rebalance the sample using propensity score matching. Since both the classical and the scientific lyceum attract pupils from the high ability group, it is not surprising that the distribution of propensity scores in the

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<sup>3</sup> Both self-reported attitudes at age 13 (included music, dance, sports, maths, computer) and the standardized exit score are from the 2016 wave. We use the panel component of the survey to retrieve this information for the individuals who are present both in 2016 and in 2018. For the rest of the sample, we assign to these variables their mean value and add to the set of covariates binary variables equal to 1 in the case of a missing value and to 0 otherwise.

two curricula exhibits substantial overlap, as shown in Figure A1 in the online Appendix.

We use the rebalanced sample to estimate the effect of the treatment on the Big Five personality traits. As additional outcomes, we consider also the probability of completing college, the log annual wage, the probability of employment and a self-reported measure of unhappiness.<sup>4</sup> The summary statistics of these variables are reported in Table A2 in the online Appendix.

## 5. Results

Our key results are reported in Table 1.<sup>5</sup> Each number in the table shows the effect on the outcome of having completed a classical rather than a scientific lyceum. We find that the estimated effect on conscientiousness and openness is small (0.57 and 0.19 percent with respect to the mean) and not statistically significant. We also find that having done classical rather than scientific studies increases neuroticism by 3.87 percent (0.235/6.072), a statistically significant effect.

According to Wadiger et al., 2017, neuroticism is the trait disposition to experience negative effects, including anger, anxiety, self-consciousness, irritability, emotional instability, and depression. Persons with elevated levels of neuroticism respond poorly to environmental stress, interpret ordinary situations as threatening, and can experience minor frustrations as hopelessly overwhelming.

Although graduates of a classical lyceum are 4.52 percent (0.034/0.746) more likely than other graduates to complete college, we do not find that they have better labor market outcomes, measured by the probability of employment and by log annual wages. Perhaps because of their higher aspirations,<sup>6</sup> that are not

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<sup>4</sup> The log annual wage is defined as  $\log(1+x)$ , where  $x$  is the annual wage, equal to zero for those not employed. Unhappiness is a binary variable equal to 1 if the individual reports to be unhappy and to 0 otherwise.

<sup>5</sup> Panels A and B in the table present the results based on entropy balancing and propensity score matching.

<sup>6</sup> See Ray, 2006, Clark et al, 2015, for the importance of aspirations in happiness studies.



reflected in better labor market outcomes, they are 20.4 percent more likely than other graduates to report unhappiness.

In addition to the estimated coefficients, the table also reports the coefficients estimated under the assumption that un-observables can affect our results, but that observables and un-observables are equally related to each outcome. Since these coefficients are very similar to our estimates, and therefore exclude zero, we conclude that accounting for un-observables would not change the direction of our results (Oster, 2019).

As we are testing multiple hypotheses one by one, the probability of obtaining one or more false rejection of the null (no statistical significance) can be significant. We therefore take into account multiple testing by using the Westfall and Young test. We find that we can reject at the 5 percent level of confidence the hypothesis that all the coefficients associated with the treatment are not statistically different from zero.

## **6. Conclusions**

The constant decline of enrolment in classical studies in Italian high schools have spurred a debate about whether this curriculum needs a substantial reform. In defense of the classical lyceum, many have argued that it increases openness and conscientiousness, two important personality traits. Our empirical evidence does not confirm this line of defense. Although classical studies could have many other merits, these do not include higher openness or conscientiousness. Rather, graduates of these studies show a higher degree of neuroticism and unhappiness than graduates of more scientific studies.

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Table 1. The effect of a classical curriculum on outcomes.

Variables	Completed college	Probability of employment	Log (1+ annual earnings)	Unhappy	Openness	Agreeableness	Conscientiousness	Extraversion	Neuroticism
<i>Panel A. Entropy Balancing</i>									
Classical curriculum	0.0337*** (0.0099)	0.0000 (0.0110)	-0.0358 (0.1106)	0.0274*** (0.0085)	0.0543 (0.0590)	-0.0308 (0.0545)	0.0227 (0.0545)	0.0844 (0.0717)	0.2350*** (0.0665)
Oster beta	0.0336	0	-0.0357	0.0274	0.0542	-0.0308	0.0227	0.0844	0.235
Westfall test	0.015								
R-squared	0.0678	0.1302	0.1405	0.0246	0.0277	0.0325	0.0296	0.0264	0.0303
<i>Panel B. Propensity score matching</i>									
Classical curriculum	0.0297*** (0.0106)	-0.0044 (0.0114)	-0.0740 (0.1148)	0.0270*** (0.0085)	0.0369 (0.0622)	0.0271 (0.0562)	0.0638 (0.0552)	0.0978 (0.0724)	0.2478*** (0.0680)
Mean	0.746	0.663	6.621	0.134	9.398	10.75	11.65	7.729	6.072
Observations	8,299	8,299	8,299	8,299	8,299	8,299	8,299	8,299	8,299

Source: our elaboration based on PLUS 2018 data. Standard errors in brackets. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

## Material for the online Appendix

Table A1 Definition of personality traits

Big Five personality traits	Positive component	Negative component
Openness (OP)	Open to experience (OX)	Conservative (CN)
Agreeableness (AG)	Loving/altruistic (LA)	Litigious (LI)
Conscientiousness (CO)	Self-disciplined (SD)	Careless/disorderly (CD)
Extraversion (EX)	Exuberant (ET)	Quiet/private (PV)
Neuroticism (NE)	Anxious (AN)	Emotionally stable (ES)

Source: our elaboration based on PLUS 2018 data.

Table A2. Summary statistics (weighted means)

Variable	Mean	Std. dev.	Min	Max	Obs
Female	0.523		0	1	8,299
Completed college	0.746		0	1	8,299
Classical Lyceum	0.344		0	1	8,299
Employment probability	0.663		0	1	8,299
log (1+annual wage)	6.621	4.288	0	13.349	8,299
Unhappy	0.133		0	1	8,299
Openness	9.398	2.398	2	14	8,299
Agreeableness	10.750	2.224	2	14	8,299
Conscientiousss	11.650	2.212	2	14	8,299
Extraversion	7.729	2.874	2	14	8,299
Neuroticism	6.072	6.014	2	14	8,299

Source: our elaboration based on PLUS 2018 data.

Figure A1. Propensity score by type of school

