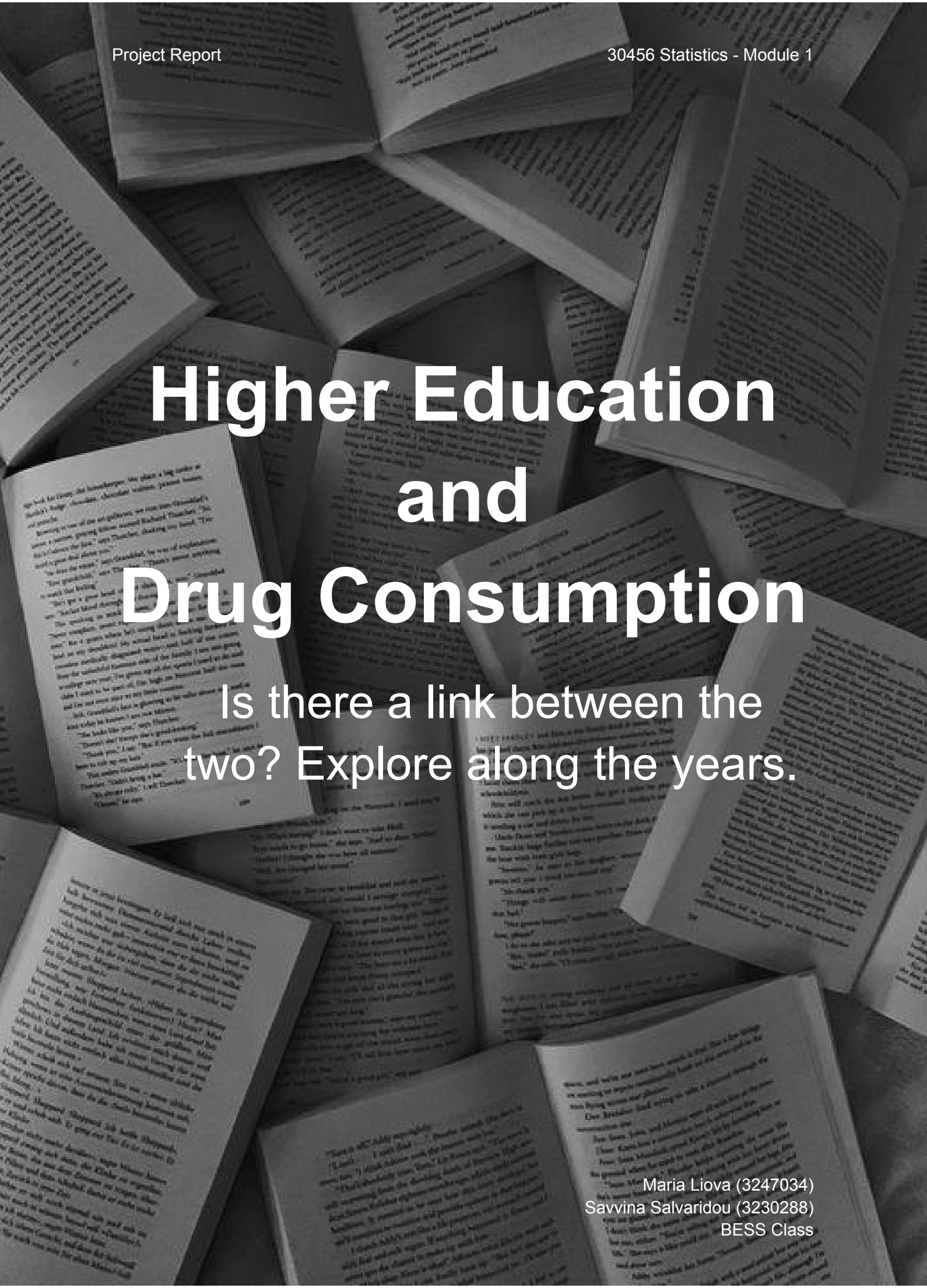

Higher Education and Drug Consumption

Is there a link between the two? Explore along the years.

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Abstract

During recent years, we observe an important transition to postsecondary education as attending school (up to 16 years old in Italy) has become compulsory and a prerequisite for most professional careers. In fact, over the past decades, we also observe an increase in the level of the educational qualification of the population. For example, in the US the number of college graduates increased from around 16% in the 1980s to more than 37% in 2022. This increase in the level of qualification has numerous sources. The past decades have been marked by globalization and the development of technology which have reshaped the needs of the global labor market, consisting of individuals who possess a broader knowledge base and more specialized skills. This increase in the level of qualification and notably in the duration of studies has had many impacts on the way of life of the population, in terms of prosperity as well as well-being.

In fact, recent years are also characterized by an increase in the use of drugs, be it legal or illegal. For instance, we observe that drug overdose deaths since 2000 in the US are nearing 1 million. On top of that, the consumption of legal drugs used to improve health has also risen. Therefore, this project aims to inspect the relationship between the number of years spent on education by individuals and their drug consumption, through an in-depth statistical analysis of concrete data.

At first thought, we were not certain about whether the relationship between the two variables would be positive or negative. We believed that a decent level of education would lead to economic prosperity and therefore a healthy life. On the other hand, demanding education and academic pressure can cause an increase in the levels of drugs consumed. The latter hypothesis was partially proved by our analysis and we came to the realization that higher levels of education go with a higher consumption of illegal and legal drugs.

Our Dataset

In order to explore whether there is a link between highly educated people and drug consumption in Italy we used the Italian National Institute of Statistics (Istat) and collected data from a sample of up to 175 thousand people annually.

For the former variable, the data we obtained divides the population of each region with respect to higher level of education every year. From this data we derived the percentage of highly educated people. Our second variable, drug consumption of legal (prescriptions) and illegal drugs stemmed from an annual survey which measured the percentage of people from each region that had been administered drugs in the last two days.

We conducted an analysis across two time periods, 2005 and 2020 in order to observe whether a correlation exists and if the two variables comove along the years. Following the collection and organization of the data, we resulted with 22 statistical units (different regions) and four variables: two for each period.

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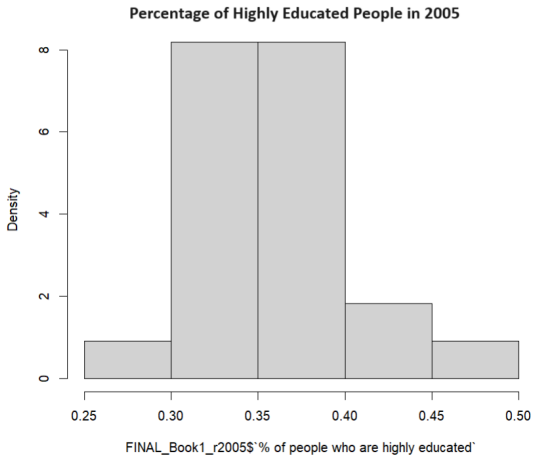
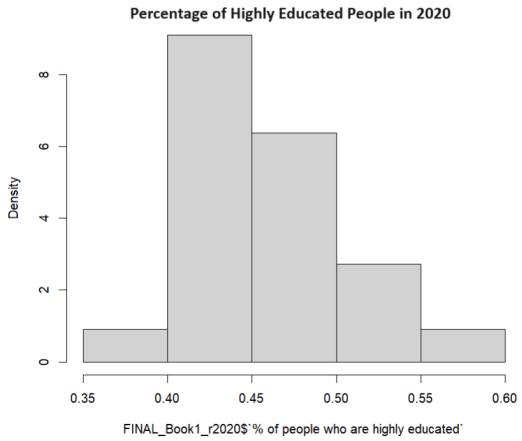
Univariate Analysis

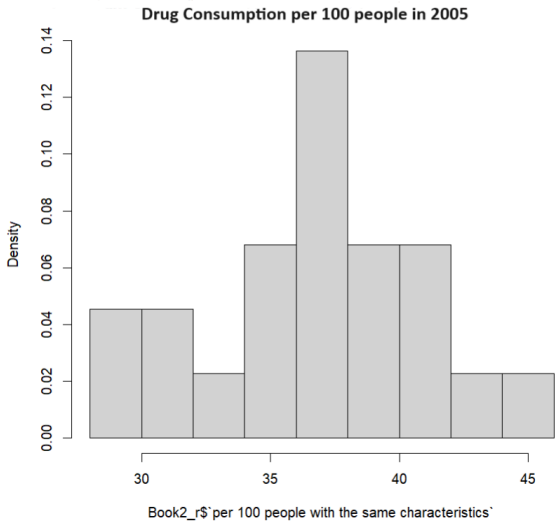
Centrality

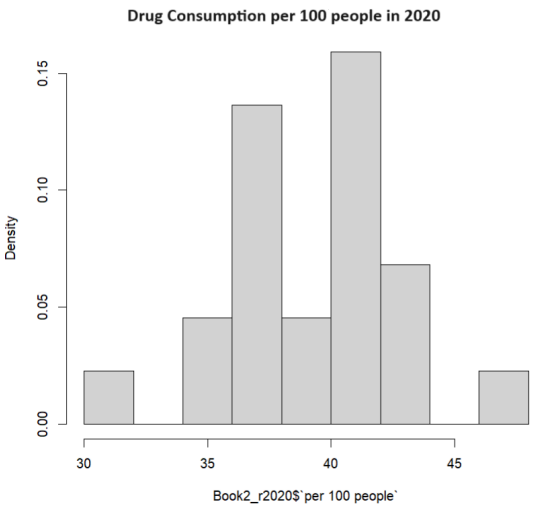
With the aim to compare our variables across time and among each other, we created four different histograms portraying automatically generated groups and their corresponding densities. It is evident that the amount of educated people has risen immensely not only by the densities and the maximum one (higher than 8 in 2020) but also by the percentages that form the groups in the x-axis. Moreover, it can be stated that both in 2005 and 2020 the histograms related to the educated people are positively skewed.

Furthermore, drug consumption has also increased which is mainly comprehended after closely observing the y-axis. Lastly, the concentration in the middle groups appears to have grown.









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Variability

First and foremost, after calculating the sample medians of the four variables, we observe that for all of them, the medians are slightly greater than their sample means, therefore confirming the positive skewness that can be observed on the graphs above (essentially for highly educated people).

On top of that, even though variability is relatively low for both of the variables during the two periods, we can observe, mainly thanks to the boxplot and the quartiles, that between 2005 and 2020 the values for both variables have increased. Standard deviation is low as well, meaning that the data are clustered tightly around the mean. Drug consumption as well as the number of years of education in the population have increased over the years. For the variable describing highly educated people, we can even observe one outlier in 2005 and 2020 respectively, higher in 2020.

	Highly Educated People in 2005	**Highly Educated People in 2020**	**Drug Consumption per 100 people in 2005**	**Drug Consumption per 100 people in 2020**
Sample mean	0.35	0.46	36.84	39.34
Sample Range	0.1859465	0.1850144	16.4	15.1
First Quartile	0.3252220	0.4303080	34.45	36.925
Sample Median	0.3529033	0.4505577	37.20	39.950
Third Quartile	0.3741423	0.4848786	39.75	41.525
Sample Interquartile Range	0.04892027	0.05457059	5.3	4.6
Sample Variance	0.001669571	0.001931255	18.16641	11.00158
Sample Standard Deviation	0.04086038	0.04394605	4.262207	3.316863
Coefficient of variation	0.1158273	0.09518975	0.115678	0.08431079

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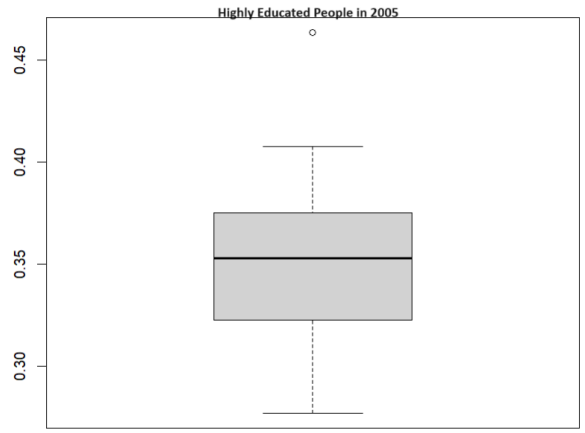

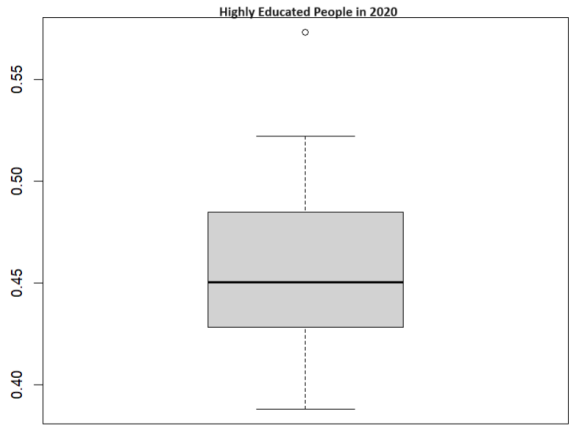

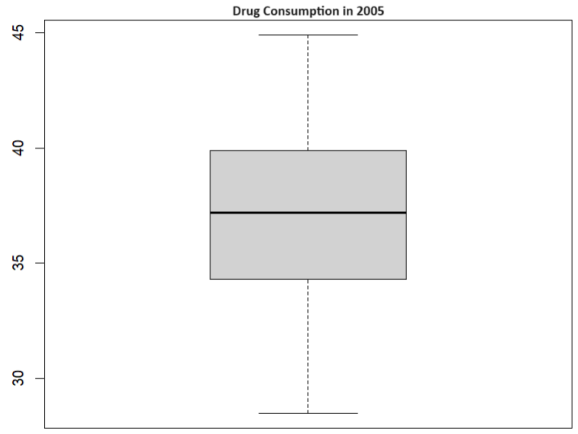

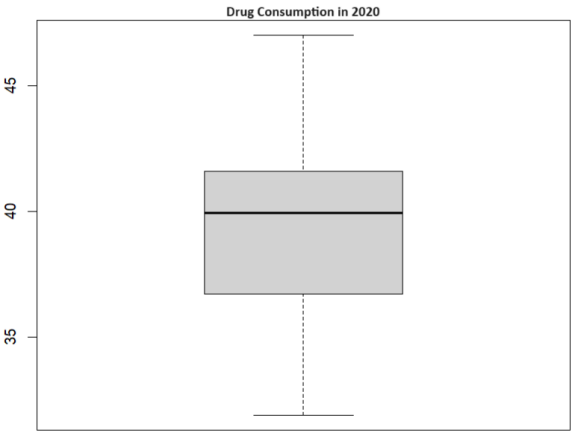

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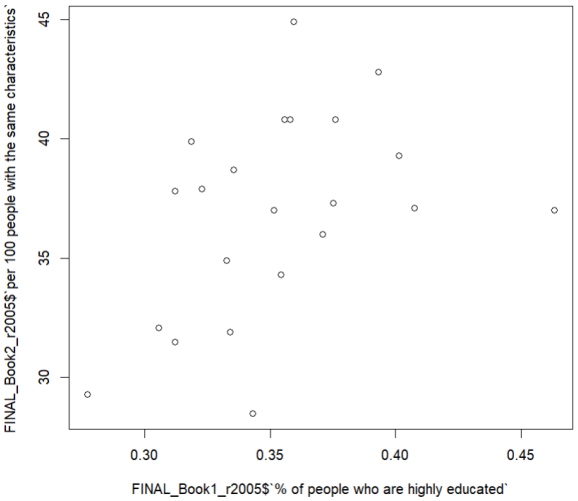
Bivariate Analysis

Association

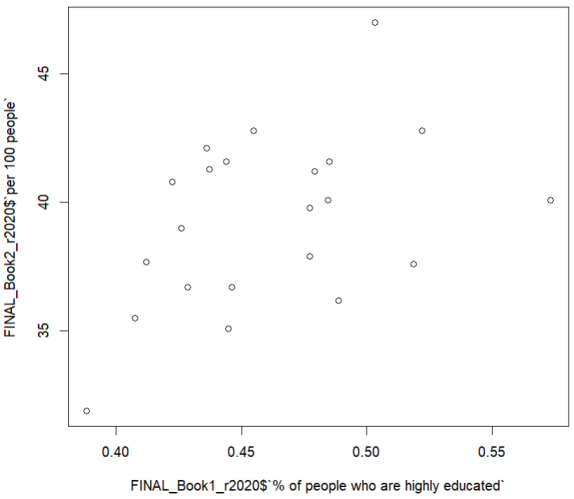
The calculations of association below as well as the two scatterplots of the two different periods manifest a positive correlation among highly educated people and drug consumption. The covariance found is positive but quite low. Additionally, the sample correlation informs us that the positive correlation is moderately strong in both periods. This means that from 2005 to 2020, one variable has not affected the other to a higher extent than the existing one.

	Education, Drugs in 2005	**Education, Drugs in 2020**
Sample Covariance	0.07496551	0.0631117
Sample Correlation Coefficient	0.4304518	0.4329747

Highly Educated People and Drugs in 2005



Highly Educated People and Drugs in 2020



Simple Linear Regression Model

Since the relation between the two variables in the two time periods seems linear and positive from the scatterplots above, we made use of the simple linear regression to further examine it. For 2005 and 2020, we created this model predicting drug consumption as a function of highly educated people. Therefore, based on our data, we found the following two equations for 2005 and 2020 respectively:

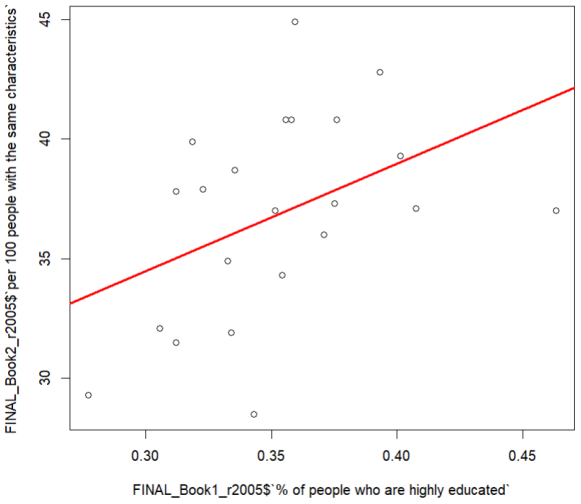
$$y = 21.006 + 44.901x \qquad y = 24.254 + 32.679x$$

From our findings, we can come to the conclusion that these two models are quite imprecise as they can be used to merely predict around 19% of the relation of the two variables in 2005 and 2020. Therefore, we can deduce that there exist other concrete variables that can have an effect on the relation between these two variables, even though a positive

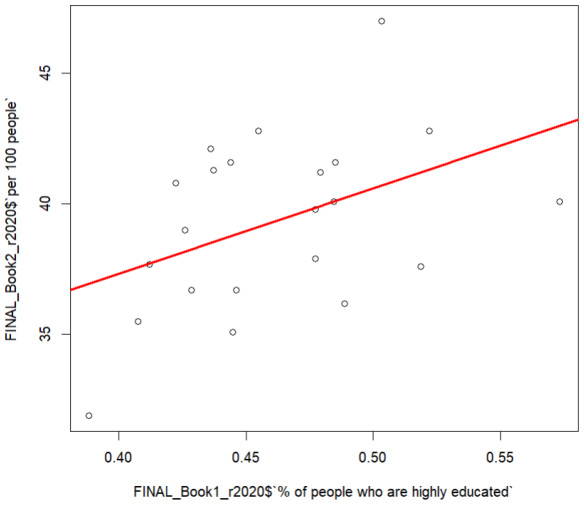
correlation can be observed between the two, which can be depicted more clearly thanks to the following scatterplots with the two increasing straight lines.

	Highly educated people, drug consumption per 100 people in 2005	**Highly educated people, drug consumption per 100 people in 2020**
β_0 coefficient	21.006	24.254
β_1 coefficient	44.901	32.679
Coefficient of determination	0.185	0.187

Highly Educated People and Drugs in 2005



Highly Educated People and Drugs in 2020



Conclusions

Throughout the thorough analysis of our data, we can conclude that there is indeed a positive relationship between high education and drug consumption, which was not quite clear at the beginning.

Firstly, from one time period to the other, both of our variables have significantly increased and a positive correlation links the two. However, this correlation is not extremely strong, meaning that this is not the case every time. In fact, illegal drug consumption can also be highly observed in less developed countries where the level of education is not quite high.

Secondly, this correlation can be explained by the fact that, in general, highly educated people have a higher standard of living, meaning better access to healthcare leading to a higher consumption of (legal) drugs.

What's more, it can be deduced that the emergence of postsecondary education over the past 20 years has indeed affected drug consumption positively, and a factor can be high levels of stress. Careers with high levels of pressure often demand important skills obtained through high education, and people often find their way out of this pressure by using drugs.

As a consequence, we can say that many factors other than education can affect drug consumption despite the positive correlation between the two variables.

References

http://dati.istat.it/
https://drugabusestatistics.org/
https://ourworldindata.org/global-education