

MINI ARTICLE

From January to December: A free fall towards stupidity.

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Abstract

In various countries, the school year is organized based on the year of birth, regardless of the month. This can lead to significant differences in student learning and skill acquisition. The focus of this work is to compare grades in various language and science subjects in standardized tests based on the month of birth.

Keywords: Intelligence; Competències Bàsiques; Data Base

1. Background

The data used in this project comes from the Dades obertes de Catalunya [1]. We used two related databases: *Avaluació de sisè d'educació primària* and *Avaluació de Quart d'Educació Secundària Obligatòria*. Due to the nature of the databases, both can be considered as a part of the same dataset. It is precisely this time span that allows us to observe the evolution of certain effects to see if they intensify or dissipate.

This work aims to find a dependance between the average grade and the month of birth in each subject as well as the overall grade. Given the functioning of the education system, academic years are based on the year of birth without considering whether the student was born in January or December. This can result in a nearly one-year age difference and, consequently, a difference in learning between two students in the same cohort.

2. Methods

To work with such a large database (and information not covered in this article), we employed database management tools such as the Python library *Pandas* and visualization tools like *Matplotlib* or *Seaborn*.

From all the data in the database, we focused on information indicating the year and month of birth of students and their final grades in the *Competències Bàsiques* of Catalan, Spanish, English, Mathematics, and Science subjects.

All the code is available to be checked and used if necessary.[3]

3. Results

Upon observing the final graphs, we can confirm that our initial perception was accurate. In overall averages, there is a clear advantage for students born in the first quarter compared to those born in the fourth Fig.1.

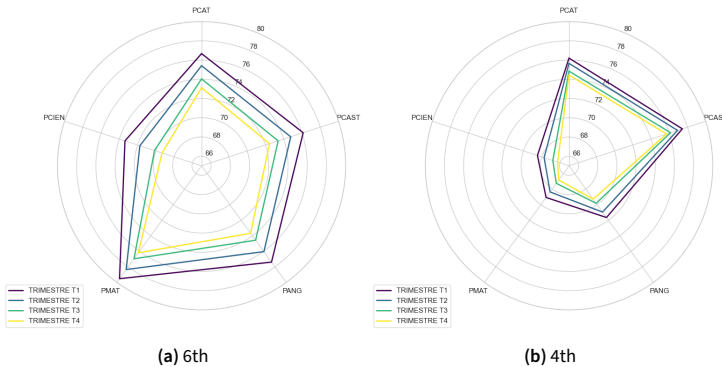


Figure 1. Average Grades

For data clarity, they have been grouped by quarters, but this trend is equally observed when represented month by month. Our second assumption is also validated: in 4th grade, the difference is slightly reduced compared to the results of 6th grade Fig.3 and Tab.1. This could be due to various factors, such as increased effort by the student, the reduced significance of the month difference over years of life, or a somewhat more concerning factor—the high number of cases of repetition among students born in the last quarter of the year[2], allowing them to recover that difference with their first-quarter peers.

It appears that not only does the average show a preference for January, but excellence also has a greater presence in the early months of the year. In this case, we observe some trend reversal among the intermediate months, but the overall trend between quarters remains Fig.2.

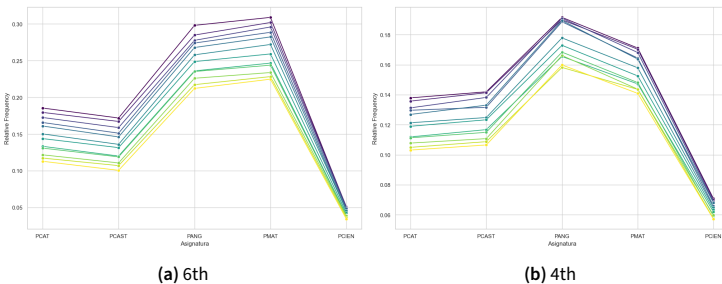


Figure 2. Grades over 90

Table 1. Slope value of the lineal regression.

Subject	6th Grade	4th ESO
PCAT	-0.39	-0.20
PCAST	-0.41	-0.19
PANG	-0.42	-0.26
PMAT	-0.37	-0.26
PCIEN	-0.46	-0.25

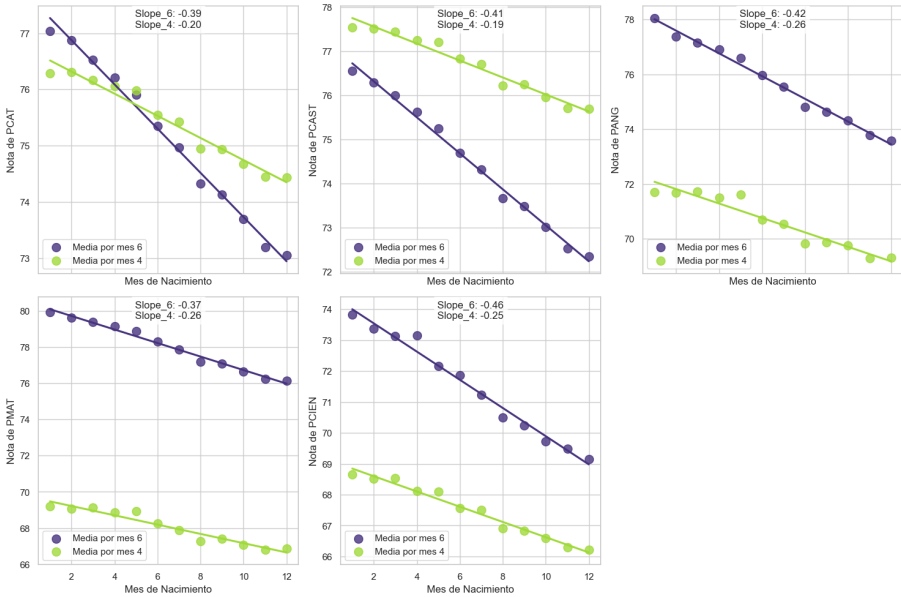


Figure 3. Grades' tendencies

4. Conclusions / Discussion

Unfortunately, as many have been thinking for some time, the education system has certain shortcomings that would be beneficial to address. It is clear that forming academic courses based on the year of birth leads to deficiencies that can persist for years.

It would be interesting to see the results of these students in exams such as the Selectividad or other standardized tests. Additionally, studying the trend of this January-December difference over the years or according to different Education laws could provide valuable insights.

References

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