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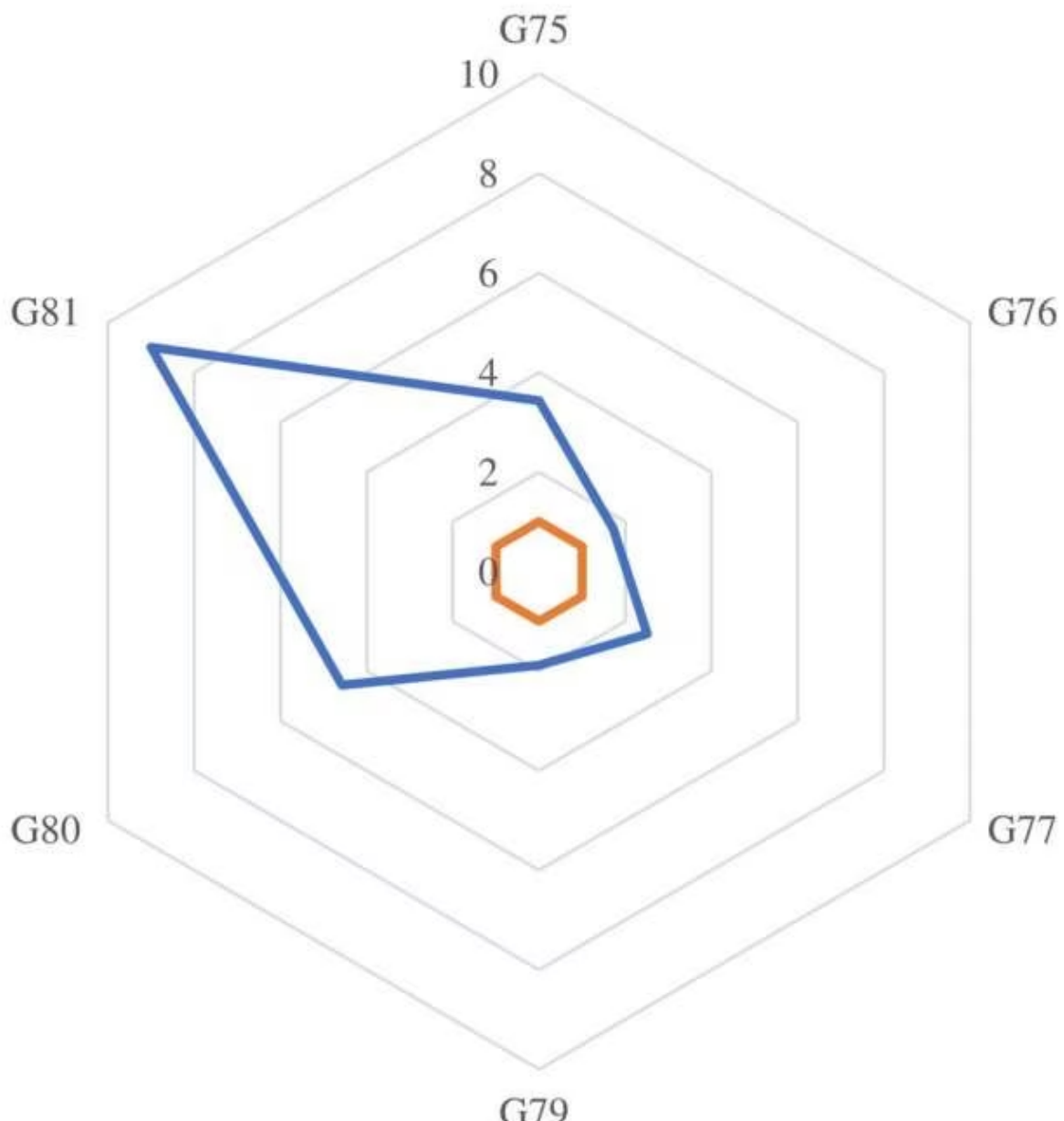
Other Sciences \ Education

Religion is not the factor that most influences rejection of evolutionary theory in schools, study says

by Maria Fernanda Ziegler , [FAPESP](#)

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Religion influences secondary school students' understanding and acceptance of evolutionary theory, but social and cultural factors such as nationality, perceptions of science and household income are more influential, according to a study involving 5,500 Brazilian and Italian students aged 14-16. An article on the study is published in the journal *PLOS ONE*.

The participants were asked to agree or disagree with a number of statements relating to Earth's age, the significance of fossils and the origin of human beings, among other topics. When the researchers analyzed the results, they concluded that nationality was more relevant than religion to acceptance of theories on common ancestry and natural selection, which was greater among Italian Catholics than Brazilian Catholics, for example, while the pattern of answers was similar among Brazilian Catholics and Protestants.

"The results of our survey show that a broader socio-cultural context influences acceptance of evolutionary theory. Conservative societies like Brazil tend to be more averse to the evolutionary ideas proposed by [Charles] Darwin and included in the school curriculum," Nelio Bizzo, last author of the article, told Agência FAPESP. Bizzo is a professor at the University of São Paulo's School of Education (FE-USP) and the Federal University of São Paulo's Institute of Environmental, Chemical and Pharmaceutical Sciences (ICAQF-UNIFESP) in Brazil.

Scientists at the Federal University of Mato Grosso (UFMT) in Brazil and the University of Trento in Italy collaborated on the study, which was part of a Thematic Project on issues relating to the inclusion of biodiversity in the school curriculum and conducted under the aegis of FAPESP's Research Program on Biodiversity Characterization, Conservation, Restoration and Sustainable Use (BIOTA-FAPESP).

"We wanted to investigate in more depth the clash between religion and evolution because we needed to explore the mechanisms of evolution in order to understand biodiversity and its conservation. They're related. Students will better understand the consequences of extinction of a species, or local and global extinctions, for example, if they're familiar with such concepts as common ancestry, natural selection and the origin of species," Bizzo said.

True or false

Analysis of responses to such statements as "The formation of our planet occurred some 4.5 billion years ago", "Humans are descended from other primate species" and "Fossils are evidence of beings that lived in the past", among others, pointed to patterns of greater or lesser acceptance by the students.

The results showed more frequent acceptance of evolution by Italian Catholics. The pattern of Brazilian Catholics' response most resembled that of Brazilian non-Catholic Christians (Protestants of various denominations).

According to the article, Italian and Brazilian Catholics differed significantly in their understanding of geological time. Indeed, the gap was wider than the difference between the views of Catholics and Protestants in Brazil. Italian Catholics accepted evolution more and also understood it better than Brazilian Catholics.

Acceptance of evolution was influenced mainly by nationality, the educational system, income and other socio-economic variables, family cultural capital, and society's attitudes toward scientific knowledge in general.

"Both countries have Catholic majorities, yet there are major social and cultural differences associated with complex factors such as education," Bizzo said.

Although scant data is available, he added, surveys by the Pew Research Center, a United States-based think tank, confirm that rejection of evolution is not generalized or deeply rooted in Italian society. "The same can't be said about Brazil," he said. "Another study by Pew showed recently that creationism is on the rise among adults in Brazil, and acceptance of evolution by Christians in Brazil is significantly lower [51%] than in Italy [74%]."

Acceptance of the theory of evolution has been investigated in many studies in recent decades because it is considered a prerequisite for a better understanding of the topic. "Our study wasn't about whether people understood evolution. It went a step further by analyzing acceptance, which is necessary to achieve comprehension. If you don't accept the idea of thinking about a subject, your understanding is inevitably compromised," Bizzo said.

Secular textbooks

In light of these findings, the researchers suggest the school textbooks supplied by the São Paulo State Department of Education on Darwin's evolutionary theories should not refer to the Bible's account of creation by God in Genesis, held sacred by Christians and Jews alike.

"Many textbooks evidently think religion alone is the most important factor when tackling evolution, which leads to Darwin's theory being intermingled with the narrative of Genesis. Our study shows that's wrong. From a theoretical standpoint, we could argue certain points regarding state secularity, but our study has nothing to do with that. What it shows is that one shouldn't assume religion must be included in any account of evolution because otherwise students won't accept it," Bizzo said.

Saved by methodology

In contrast, previous research including large-scale surveys of more than 6,000 European students found religion to be the key reason for rejection of evolution by secondary school students. The contrast may reflect methodological differences, according to Bizzo, who explained that most studies on this topic involve Likert-scale questionnaires, widely used in customer satisfaction surveys.

This methodology typically offers five response options. For example, in response to the statement that Earth is 4.5 billion years old, the options would probably be Agree completely, Agree somewhat, Neither agree nor disagree, Disagree somewhat, Disagree completely.

"The problem is that the instrument used [the Likert scale] assigns an imprecise number to statements about scientific facts. The variation in the answers can lead to imprecision when the scores are added up. For this reason, it's better to offer the options Yes or No, or True or False, in this kind of questionnaire," he said.

Moreover, he continued, the Likert scale should not be used in studies on scientific topics. "We discovered that when you present a recognizably scientific statement, such as "Vaccines are good for your health", those who disagree know they're disagreeing with a scientific finding, just as those who agree are aware they're positioning themselves in favor of science," Bizzo said.

Another methodological issue is the question of anonymity in studies on sensitive subjects such as religion, for example. "Surveys and polls with religious implications, especially in conservative contexts, should be

conducted in such a way as to avoid what the literature calls 'social desirability', where respondents know what's expected of them and try to meet that expectation instead of saying exactly what they think. Social expectations may have contributed to the imprecision of the measurements made by these different studies," he said.

More information: Graciela da Silva Oliveira et al, Acceptance of evolution by high school students: Is religion the key factor?, *PLOS ONE* (2022). DOI: [10.1371/journal.pone.0273929](https://doi.org/10.1371/journal.pone.0273929)

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