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RESEARCH ARTICLE

Perception of Undergraduate Students on the Natural History of the Human Being: A Case Study

Héctor Aponte*
https://orcid.org/0000-0001-5249-9534
Carrera de Biología Marina, Universidad Científica del Sur, Lima, Perú

Daniel Barona**
https://orcid.org/0000-0002-3339-243X
Carrera de Biología Marina, Universidad Científica del Sur, Lima, Perú

Antony-Javier Apeño-Arias***
https://orcid.org/0000-0001-9321-411X
Carrera de Biología Marina, Universidad Científica del Sur, Lima, Perú

Angela-Stefany Hernando-Blotte****
https://orcid.org/0000-0003-4449-5183
Carrera de Biología Marina, Universidad Científica del Sur, Lima, Perú

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Abstract

The perception held by undergraduate students about the human evolution plays a crucial role in the understanding of our natural history. This study assessed, through an oral survey, the perception of college students on some aspects of our natural history (665 students from a private university in Metropolitan Lima, from both science and humanities study programs). The results obtained indicate that 50% of the population surveyed consider that a god did not take part in the evolutionary process, which reflects a position in accordance with non-theistic evolution, i.e., a clearly evolutionary materialistic position. Lower percentages accepted that the human being does not come from other animal species (20%) or that we lived at the same time as dinosaurs (23%). No differences were found between science and humanities students ($p>.05$), which indicates that the findings of this study are, most probably, a reflection of pre-school and school education. The results should be taken into account in the development of courses at the primary, secondary, and university levels so that these can include contents that reinforce the scientific conceptions of our natural history.

Keywords:
evolution, perception, religion, society, undergraduate students

Percepción de estudiantes universitarios sobre la historia natural del ser humano: Un estudio de caso

Resumen

La percepción que tienen los estudiantes universitarios sobre la evolución del ser humano juega un rol crucial en el entendimiento de nuestra historia natural. En el presente estudio se evaluó, mediante una encuesta oral, la percepción

* *email: haponte@cientifica.edu.pe* ** *email: danielbarona1981@gmail.com* *** *email: antony13may@gmail.com*
**** *email: ange.hernando@hotmail.com*

de estudiantes universitarios sobre algunos aspectos de nuestra historia natural (665 estudiantes de una universidad privada de Lima Metropolitana, tanto en las carreras de ciencias como en las de humanidades). Los resultados obtenidos indican que un 50% de la población encuestada considera que un dios no tuvo parte en el proceso evolutivo, lo que refleja una postura acorde con la evolución no teísta, es decir, una postura netamente evolucionista materialista; porcentajes menores aceptaron que el ser humano no proviene de otras especies animales (20%) o que vivimos al mismo tiempo que los dinosaurios (23%). No se hallaron diferencias entre los estudiantes de ciencias y de humanidades (p>.05), lo que indica que lo encontrado en el presente estudio es, muy probablemente, reflejo de la educación infantil y escolar. Los resultados deberán ser tomados en cuenta para la elaboración de currículos a nivel primario, secundario y universitario, de manera que se puedan incluir contenidos que refuercen las concepciones científicas de nuestra historia natural.

Palabras clave:

evolución, percepción, religión, sociedad, universitarios

Percepção de estudantes universitários sobre a história natural do ser humano: um estudo de caso

Resumo

A percepção que os estudantes universitários têm sobre a evolução do ser humano tem um papel crucial no entendimento da nossa história natural. Neste estudo, avaliou-se, a través de uma pesquisa oral, a percepção de estudantes universitários sobre alguns aspectos da nossa história natural (665 estudantes de uma universidade privada de Lima Metropolitana, tanto dos cursos de ciências como de humanidades). Os resultados obtidos apontam que um 50% da população pesquisada considera que um deus não teve parte no processo evolutivo, o que reflete uma postura condizente com o evolucionismo não teísta, isto é, com uma postura essencialmente evolucionista materialista; porcentagens menores aceitaram que o ser humano não descende de outras espécies animais (20%) ou que convivemos com os dinossauros (23%). Não houve diferenças entre os estudantes de ciências e de humanidades (p>.05), o que indica que os achados no presente estudo são, muito provavelmente, o reflexo da educação infantil e escolar. Os resultados deverão ser levados em conta para a elaboração de programas curriculares a nível primário, secundário e universitário, de maneira que possam incluir-se conteúdos que reforcem as concepções científicas de nossa história natural.

Palavras-chaves:

Evolução, percepção, religião, sociedade, estudantes universitários

Introduction

For some years now, survey companies such as Gallup, Ipsos MORI, Pew Research Center, and Eurobarometer have been conducting international surveys in which different aspects of North American and European society have been evaluated. Questions about knowledge of basic aspects of human evolution and natural history are part of the topics covered (a review can be found on Dawkins, 2010). For example, Gallup's latest survey, aimed at understanding Americans' views on human origins, has shown that 76% of the population surveyed in the United States is unaware of certain important issues in human evolution and natural history, with inadequate perceptions of historical aspects, origin, and relationships with other species (Gallup International, 2017). The same survey was recently carried out in Metropolitan Lima, finding that 34% of the population is unaware of the past of our species, as well as its evolutionary history (showing greater preference for creationist expressions or others related to intelligent design); 48% does not agree that we have evolved from other animal species; and 32% consider that human beings lived at the same time as dinosaurs (Aponte et al., 2017). This perception may be influenced by the high religiosity of our country and by overall ignorance of basic sciences by the population, making it one of the most religious countries in the world (Gallup International, 2012).

In Peru, religious influence is noticeable at the educational level, since there are many religious institutions at the school level and even in higher education. In order to have an idea of the

religious reach in schools, Catholic education can be provided in Peru in self-financed, co-financed, and state-run educational centers, which allows a single educational program of this type to reach thousands of young people (for example, in 2011, Fe y Alegría had 78 schools, 3,900 teachers, and 81,500 basic education students (Alcázar & Valdivia, 2011). This situation influences the education of young people, and it is evident in the way they perceive nature, given that science and religious dogmas try to explain the same issues (such as the origin of life), but in different ways (Kosasia & Sikolia, 2015). To date, the teaching of evolution in schools triggers religious, political, and social conflicts, which can affect the way instructors teach this topic (Forbes, 2001). On the other hand, creationist thinking is closely linked to religiosity (Coyne, 2012; Dawkins, 2010). With respect to this last point, Coyne (2012) shows that, in the main First World countries, religiosity is inversely correlated with public acceptance of human evolution as a process that explains our origin. Likewise, there is a directly proportional relationship between the acceptance of human evolution as a biological process and the Successful Societies Scale, designed by Paul (2009), which involves 25 different indicators of well-being. This trend may imply a reduction in the exercise of critical thinking, which is vital for the development of science and a welfare-oriented society (Aponte et al., 2017; Coyne, 2012; Dawkins, 2010).

Within this context, it is very important to get to know the perception of undergraduate students regarding some evolution topics, so that we can understand the ideas they have during their professional training and the challenges faced by science instructors. Likewise, it is interesting to know if, within our sample, there are marked tendencies among the students who opt for majors in the two large groups considered (science and humanities majors), so that we can determine if this decision is accompanied by a scientific or dogmatic perception of nature in the population studied. This distinction is necessary because science students are or have been more exposed to information from scientific research and know the scientific method, while humanities students have had on average less or no exposure to the methods of science. In addition, there is evidence that science students' cognitive functioning is more linked to the systematization of information, whereas humanities student' cognition is more linked to emotion, the latter being a cognitive characteristic directly related to religiosity (Atran & Henrich, 2010; Focquaert, Steven, Wolford, Colden & Gazzaniga, 2007).

This study was aimed at knowing the perception of undergraduate students from a private university in Metropolitan Lima on the evolutionary history of the human being, taking as population the students enrolled in the academic semester 2017-1. As a secondary objective, we wanted to assess whether there were any differences between the students of science and humanities majors included in the sample, in order to show whether there was any difference in the thinking of these two sectors of the population.

Method

Design

In order to fulfil the objectives of this work, a quantitative, non-experimental, descriptive study was proposed, in which the population evaluated was a representative sample of the students enrolled in the 2017-1 academic semester.

Participants

The sample was made up of students from a private university in Metropolitan Lima enrolled in the 2017-1 academic semester. Their average age was 19.8 years old (range 16-31 years old), and they were enrolled in sciences (Marine Biology, Stomatology/Odontology, Aquaculture Engineering, Forestry Engineering, Environmental Engineering, Human Medicine, Environmental Architecture and Urbanism, Veterinary and Zootechnical Medicine, Nutrition and Dietetics, and Psychology) and humanities (Business Administration, International Business Administration, Performing Arts, Communication and Advertising, Law, Business Systems Engineering, Economic Engineering, Marketing and Administration, Sustainable Tourism and Hospitality) majors. A total of 655 students were surveyed, 357 from the sciences and 298 from the humanities study pro-

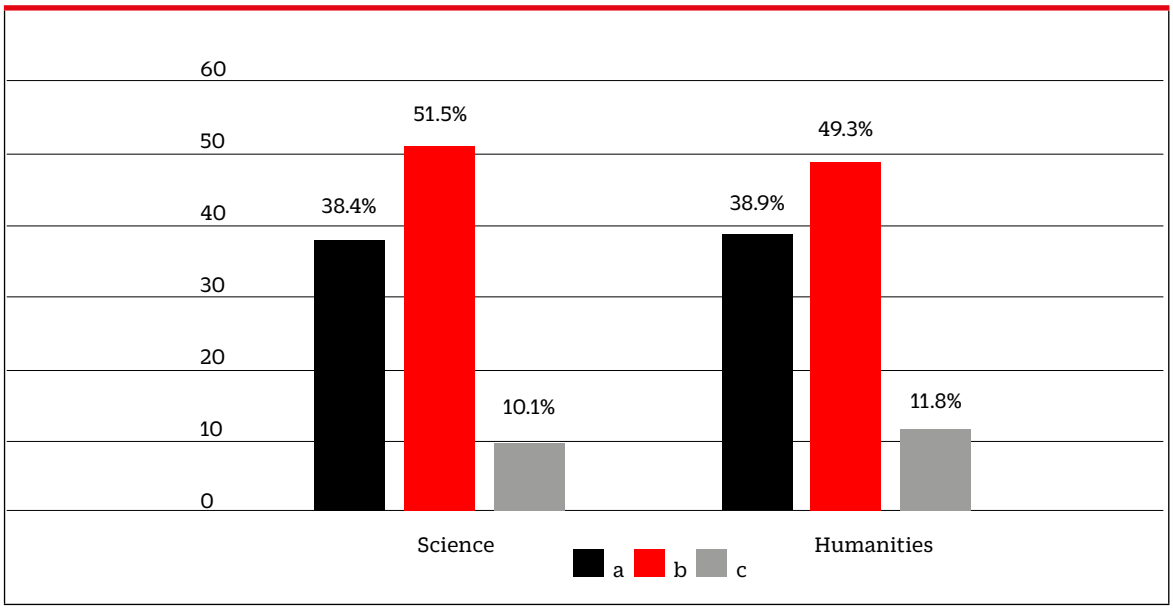

Figure 1. *Answers to question 1: Select the right statement: a) Humans have evolved over millions of years from less advanced life forms, but God guided this process; b) Humans have evolved over millions of years from less advanced life forms, but God had no part in this process; c) God created humans practically in their present form at one time in the last 10,000 years or so.* **Note***: The percentage of science and humanities students is shown.*

grams, these values being the sample size for each category (5% error and 90% confidence level). Each major was sampled in proportion to the relative size of its population in relation to the total number of enrollees. From this sample, 264 were men and 391 were women. The sampling procedure was carried out through a survey.

Instruments

The test consisted of two questions previously used with the population of Metropolitan Lima related to the natural history of human beings (Aponte et al. 2017), which in turn were taken from surveys conducted internationally over several years (Dawkins 2010, Gallup International, 2017). The questions were:

Question 1: Select the right statement

a) Human beings have evolved over millions of years from less advanced life forms, but God guided this process.
b) Human beings have evolved over millions of years from less advanced life forms, but God had no part in this process.
c) God created human beings practically in their present form at one time in the last 10,000 years or so.

Question 2: State true or false

a) Human beings, as we know them today, evolved from earlier animal species (_)
b) The first human beings lived at the same time as the dinosaurs (_)

Procedure

The survey was conducted in June 2017 orally (it was not given to respondents for resolution) and the respondents' choices were recorded. It was explained to participants that the survey would be anonymous, voluntary, and part of a research project. Once carried out, the results were analyzed by counting the answers and calculating their proportions in relation to the total population and to the science and humanities students separately. In order to verify if there were any differences between science and humanities students, a chi square test was performed, preparing a contingency table with the proportions of students according to their answers in both categories (science and humanities) and finding Cramer's V; this was done using the PAST V 2.17c software (Hammer, Harper, & Rayan, 2001).

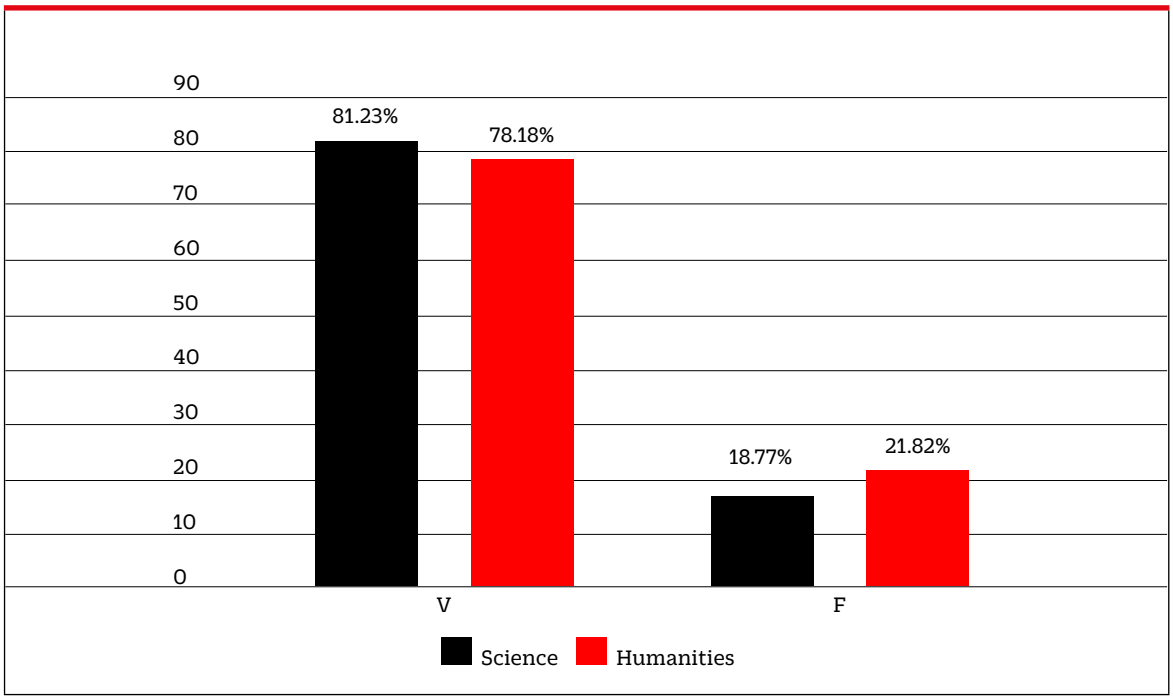

Figure 2. *Answers to question 2a: State true (V) or false (F): Humans, as we know them today, have evolved from earlier animal species. The percentage of science and humanities students is shown.*

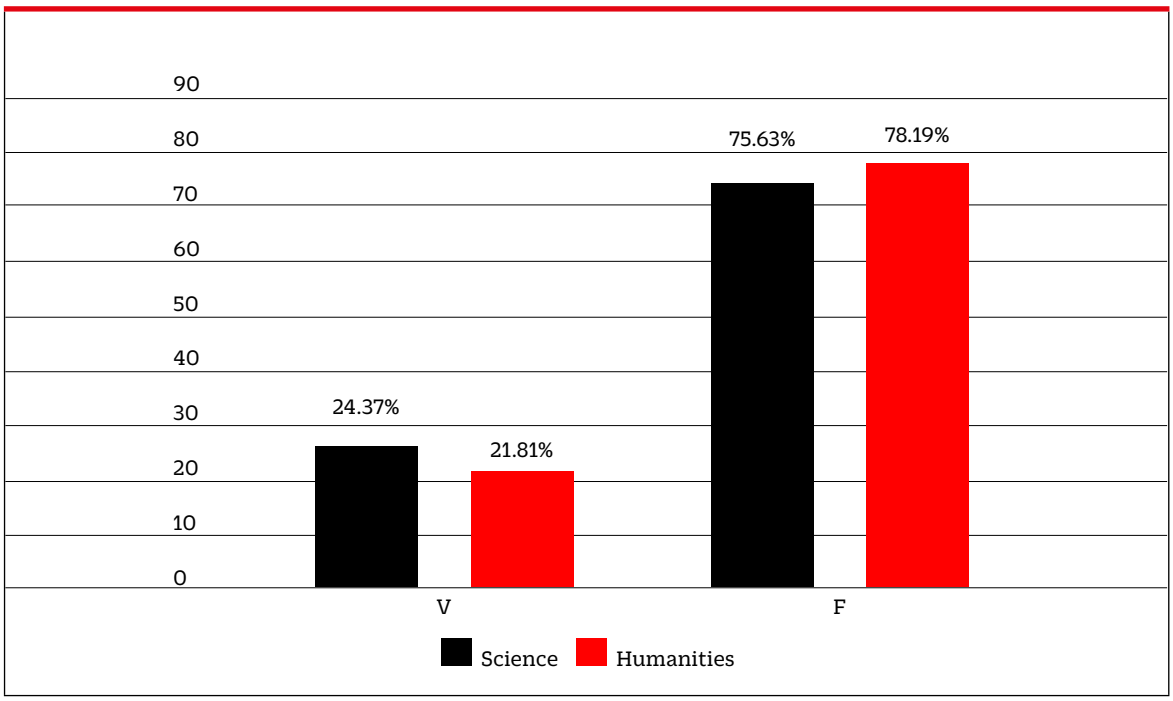

Figure 3. *Answers to the question 2b: State true or false: The first human beings lived at the same time as the dinosaurs. The percentage of science and humanities students is shown.*

Results

For question 1, 39% preferred statement a, 50% preferred statement b, and 11% preferred statement c. For question 2a, 80% considered that the statement was true, while the remaining 20% considered that it was false. Finally, question 2b was considered true by 23% of respondents and false by 77%. No differences were found between the preferences of science and humanities students (p >.05 for all Chi-square tests; the values for Cramer's V were .02, .04, and .04 for questions 1, 2, and 3, respectively).

Discussion

The results obtained indicate that 50% of the population surveyed considers that a god did not take part in the evolutionary process, which reflects a position in accordance with non-theistic evolution, that is to say, a purely materialistic position. On the other hand, the respondents who selected answer 1a can be said to hold a view known as theistic evolution, that is, a type of evolution that admits the intervention of a divine being (Thagard & Findlay, 2010). The same is reflected in questions 2a and 2b, where 20% seem to be unaware of aspects related to natural history: Human beings come from a lineage of predecessor species and did not live at the same time as dinosaurs (our natural history is temporarily separated from them by tens of millions of years) (Apesteguía & Ares, 2010). The 20% of students (who gave these answers) may be the result of religious influence or ignorance of the chronology of major events in Earth's natural history.

The fact that there is not a difference between science and humanities students indicates that the findings of this study are not the result of the students' own interest in a particular major, but rather a reflection of the previous school education or upbringing they had at home. In recent years, issues related to the evolution and origin of the Earth's organisms are being included early in the school curriculum (Ministry of Education, 2016). This seems to have a strong influence on younger generations, who learn to differentiate between myths, beliefs, and scientific knowledge. The role of universities is fundamental to build the foundations for knowledge and develop scientific thinking in students. Note that some universities could contribute to this problem by lending their names for creationist events, making their facilities available for massive religious events, or organizing talks in support of creationism. The possible repercussions that this type of manifestations could have on the conception of our nature and our origin must be evaluated in order to rule out any negative effect on society. Part of these repercussions or negative effects are related to a decline in critical thinking, the hindering of the development of a welfare society, and the biased vision of science and its methods (Aponte et al., 2017; Coyne, 2012; Dawkins, 2010).

The results of this study correspond with what was observed in Metropolitan Lima, where older and less educated population (over 35 years of age) showed a mainly creationist stance (Aponte et al., 2017). By removing these variables from the respondent population, the balance tilts toward scientific knowledge. In comparison with the aforementioned study, the population evaluated in this study showed a more scientific perception of our natural history, which complements the observation that academic experience influences a more scientific stance on these aspects of human life.

It is essential to foster critical thinking and generate spaces for discussion that allow students to exchange scientific ideas and debate with evidence issues related to evolution. The development of a scientific conception of our environment will go hand in hand with an intellectual autonomy that must be developed in the classrooms from the very early stages, given that a critical attitude has repercussions not only in a person's academic experience, but also on a personal level (López Aymes, 2012).

One possible way of dealing with this problem, at least at school level, could be the one suggested by Yasri & Mancy (2014), which consists in identifying the personal stance of students on the relationship between science and religion, more specifically between evolution and creationism, before proceeding to teach about evolution in

schools. In their research, they were able to identify five different stances on the subject: exclusive creationism, compartmentalization, contrast, coalescence, and complementarity. From these five stances, only three show compatibility between science and religion (contrast, coalescence, and complementarity). Therefore, the strategies necessary for the teaching of evolution could be adapted to the cosmovision of students. One of the proposed forms is the approach of Non-Overlapping Magisteria (NOMA, Gould 1999) which proposes that science and religion have totally different objectives and are therefore compatible as they do not overlap. However, the application of this approach is controversial because of its philosophical implications, since it can be applied only if those religions that are not in conflict with science are considered genuine, leaving many current religions out of this category. Furthermore, any theistic religion is in conflict with science from the very moment it attempts to explain nature through divine action, both in terms of its origin and of the natural processes that occur in time. In any case, Gould's idea of Non-Overlapping Magisteria describes how we should use and interpret science and religion, but not how they relate in reality (Coyne, 2012; Glennan, 2009).

The results of this study describe the evolutionary thinking of a college population in Lima and lay the groundwork for further studies of this type on a regional and national level. The results obtained will be very useful for science professors, who can use this case study as reference for designing study plans for science courses (such as ecology, evolution, and environment), where evolutionary issues are frequently addressed.

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