

## The pro-science wave in times of denialism: Brazilian society's perception of science, scientists, and universities during the COVID-19 pandemic

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**Abstract** *This article presents the results of our study on the public perception of science during the COVID-19 pandemic in Brazil, carried out at the Centro de Estudos SoU\_Ciência, from Universidade Federal de São Paulo (UNIFESP). To answer the question: “Has the COVID-19 pandemic changed the perception of Brazilian society about science, scientists, and universities?”, quantitative and qualitative studies were conducted between August 2021 and July 2022. In national quantitative public opinion surveys, we collected exclusive data from a historical series of polls on the subject in Brazil, and in focus groups, we deepened studies on the perception and political position of different social segments. Amid the growth of scientific denialism; political and social setbacks; and the dismantling of public policies, specifically scientific and technological, resulting from the impeachment of 2016 and the election of Bolsonaro in 2018, research indicates, apparently contrary to an obscurantist political tendency, a significant expansion of public interest in science during the pandemic in the country. This paper analyzes the emergence of a “pro-science wave” in public opinion in Brazil, the factors that led to its emergence during the pandemic, and its current prospects.*

**Key words** *Public opinion, Science, Pandemic, Coronavirus, Brazil*

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## Introduction

The COVID-19 pandemic worsened the socio-economic inequalities and poverty in Brazil, further hampering the living conditions of people with the lowest income. According to the Brazilian Institute of Geography and Statistics (IBGE)<sup>1</sup>, the loss of income was disseminated in every social segment, but the poorest part of the population (the 10% with the lowest income) suffered a decrease that exceeded 31.8%, while the richest 1% witnessed a 6.4% loss in income. Studies indicated that 33 million Brazilians were starving, and 58.7% of the population was in a state of food insecurity, pushing the country back to the levels seen in the 1990s<sup>2</sup>.

Among the perverse aspects of social inequality, what stands out is the unequal access to education, culture, and scientific knowledge. According to the Organization for Economic Cooperation and Development (OECD)<sup>3</sup>, only a small percentage (approximately 21%) of the Brazilian population, aged 25 to 34 years, has a college degree. These findings, in terms of education, place Brazil behind Argentina (40%), Chile (34%), Colombia (29%), and Costa Rica (28%), and far from the average for OECD countries (44%).

These factors should already be enough to produce an adverse scenario for science in Brazil. However, the worsening of social inequalities was further compounded by a political scenario that compromised the country's democratic achievements. Since 2016, with the impeachment of President Dilma Rousseff and, more acutely, after the election of Bolsonaro in 2018, the country had to face political and social drawbacks, including the dismantling and underfunding of several public policies related to science and technology, as well as other direct attacks on people's rights. In 2022, the Bolsonaro administration transferred resources from the National Fund for Scientific and Technological Development (FNDCT, in Portuguese) for other budgetary purposes. In the context of this extremely critical scenario, during which the COVID-19 pandemic took place, it is also important to highlight the impact of Constitutional Amendment 94/2026, approved during the Temer administration, known as the "Expenditure Ceiling", limiting increases in policy funding, such as those in the areas of education, health, and social assistance, to the variation of inflation for the next 20 years.

This critical situation affected universities and Brazilian scientific research, resulting in crises within these institutions. As analyzed by Boaventura Santos<sup>4</sup>, there was a de-capitalization of uni-

versities and transnationalization of the university education market, as well as the impact of new information technologies and the loss of hegemony in the university and scientific knowledge, which began to be questioned by society, and led to the epistemological discrediting of universities and a certain disorientation in terms of their social purposes<sup>4</sup>. The overall critical situation of universities was further compromised by the international scenario of a trend of expansion of extreme-right politics. In Brazil, this setting resulted in the election of a president who was identified with this type of ideology: anti-democratic, anti-intellectual, neofascist, neoliberal, and denialist<sup>5</sup>.

The federal government, as studies have denounced<sup>6-8</sup>, not only omitted itself from the implementation of minimally required measures to fight the pandemic, but, to the contrary, acted openly in favor of the dissemination of the disease, going against recommendations set by international organizations, spreading misinformation, fake news, and even worse, fake science. In the area of education, the officials and supporters of the government began to wage an ideological war and to spread false and demeaning accusations, explicitly attacking public universities<sup>9</sup>, which are the locations of more than 90% of scientific research in Brazil, as indicated in surveys by international organizations<sup>10</sup>.

These factors potentially created a favorable situation for the progress of anti-science movements in the country. However, despite the context of regression imposed by the federal government upon the country, studies indicate that there was an increase in the interest and valuing of science by the general population during the pandemic, which resulted in a so-called "pro-science wave" in Brazilian public opinion.

The increasing pro-science trend throughout the pandemic brings to light another important historical element: the path toward the construction of public health and vaccination policies, and of the research institutes and university system in the country. The creation of the Brazilian Unified Health System (SUS) as a result of social struggles, and the consolidation of the National Immunization Program (NIP) were decisive barriers against anti-vaccine discourse and practice. As shown by FIOCRUZ<sup>11</sup>, the NIP has had ample and successful results, and has become an international reference for health policies by offering free access to all of the vaccines recommended by the World Health Organization (WHO). This trajectory of education, research and attention to public health, and its organization and capillarity contribute to the population's adherence

to the vaccines and to trust in SUS, science, and the countries' universities, which rank high in national and international standards.

Brazil is a pioneer in Latin America in studies concerning the public perception of science and technology<sup>12</sup>. The historical set of inquiries, conducted in 1987, 2006, 2010, 2015, and 2019, involved important Brazilian research institutions, such as the National Council for Scientific and Technological Development (CNPq, in Portuguese) and Fundação Oswaldo Cruz (Fiocruz, in Portuguese), with the last two editions having been conducted by the Center for Management and Strategic Studies (CGEE, in Portuguese) and the Ministry of Science, Technology, and Innovation (MCTI, in Portuguese). Since 2015, research in Brazil follows the Antigua Manual<sup>13</sup>, produced by the *Red Iberoamericana de Indicadores de Ciencia y Tecnología (RICYT)*, the *Observatorio Iberoamericano de la Ciencia, la Tecnología y la Sociedad (OCTS)*, and the *Organización de Estados Iberoamericanos para la Educación, la Ciencia y la Cultura (OEI)*, aiming to develop common methodologies for inquiries in the countries involved.

Based on analyses from previous research, the present article posits the following core question: Did the COVID-19 pandemic change the perception of Brazilian society regarding science, scientists, and universities? The results of the study indicate an increase in interest for science and technology, which reached 92% of the Brazilian population, and the increase in trust in scientists, reaching record levels and placing them higher than all of the other professional categories. The emergence of a pro-science wave in Brazilian public opinion, identified in surveys conducted during the pandemic, led us to think about its characteristics and how it manifests into different social segments. We also seek to understand the political meaning and the perspectives of this pro-science wave, which emerges as a counterpoint to the growth of denialist, anti-vaccine, and obscurantist movements in the country. The objective of this study is to present data regarding these issues, with analyses that indicate important clues for the current political disputes and the role of science and public universities in the construction of new perspectives for Brazil.

## Research methodology

This is a qualitative and quantitative study, conducted through a bibliographic review, national public opinion surveys, and focus groups. The

bibliographic review provided an analysis of both the literature and previous studies on the public perception of science in Brazil developed by different institutions, which can be used for comparisons and as a methodological reference.

For the national level public opinion surveys (POS) conducted in a partnership with the IDEA Institute, specific questions were included and national inquiries were conducted by the institute, by means of telephone calls to mobile phone lines. The interviews, conducted by a questionnaire applied to representative samples of the Brazilian population, included 5 rounds, between August 2021 and June 2022, with 1,200 to 1,500 responding individuals, men and women from all regions of the country, aged 16 or above, and detailed as follows:

POS 1: August 2021 (1,248 respondents)

POS 2: October 2021 (1,500 respondents)

POS 3: November/December 2021 (1,271 respondents)

POS 4: January 2022 (1,252 respondents)

POS 5: July/August 2022 (1,200 respondents)

The segmentation of interviewees was conducted by sex, age, color or race/ethnicity, region of the country, level of education, social class, income, religion, type of municipality, and political standings (in favor of the government or against it), and how they evaluated the government. With a 95% confidence interval (CI) and a maximum predicted margin of error of 2.85% above or below, the samples from the two phases (probabilistic and quotas) – according to the methods set forth by Fowler<sup>14</sup> and Bussab & Morettin<sup>15</sup> – showed variable quotas related to the distribution of the population by region of the country and proportions defined by Pnad 2018 and 2021, and by the 2010 Census. The questions concerned the perception of science, scientists, and universities; access to scientific information; society's demands from science and universities; and the pandemic and the current challenges the country faces. Also included was the data collection of the historical series on the theme in Brazil, replicating selected questions, and using the same wording and answer options from previous inquiries.

The focus groups, based on the method defined by Woodyatt et al.<sup>16</sup>, allowed us to deepen the quantitative studies, investigating the perceptions by different segments, the discourse and political opinions, as well as the evaluation of the government and scientific communication. In a partnership with the same research institute, two sessions of virtual mediated debate were conducted with seven participants, recruited from the different regions of Brazil, men and women,

aged 25 years and above, with a medium level of education and income (from the B and C social classes, with complete or incomplete High School education), for and against the Bolsonaro administration. Conducted in October 7th and December 9<sup>th</sup>, 2021, and lasting 100 to 130 minutes, the first group focused on people who reported being interested in science and with divergent political standings, while the second group identified themselves as being against public universities, searching for knowledge from profiles, discourses, and information sources.

The empirical material supports the analyses presented in this study, organized in the following topics: 1) interest in science during the pandemic; 2) credibility attributed to scientists; 3) recognition of research institutions; 4) evaluation of the handling of the pandemic and the investment in science; and 5) information and communication about science and universities. At the end of this study, conclusions will be presented as will new questions and perspectives raised from the research.

## Results and discussion

The historical series analysis on public perception regarding science and technology, according to data from CGEE<sup>17</sup>, indicates that the interest of Brazilians in science in the last decade “reached a peak” of about 60%. In 2010, the interest reached 64% of the population, and in 2015 and 2019, within the margin of error, it reached 61% of all Brazilians (Figure 1A).

During the pandemic, in a tragic scenario for both society and science, amid political debate defending the adoption of adequate measures for the prevention, treatment, and vaccination against COVID-19, we asked: What was the impact of this context on the public perception regarding science in Brazil? The data from the survey is analyzed below.

### Interest in science during the pandemic

In the 2022 survey (POS 4), we identified an impressive growth in terms of valuing science in Brazil. Data obtained for the level of interest in eight areas (politics, health, environment, arts and culture, science and technology, sports, economy, and religion) indicate that, in the previous surveys (2010, 2015, and 2019), the themes found most interesting to the population were: medicine and health (87%) and environment (86%), followed by science and technology (82%)

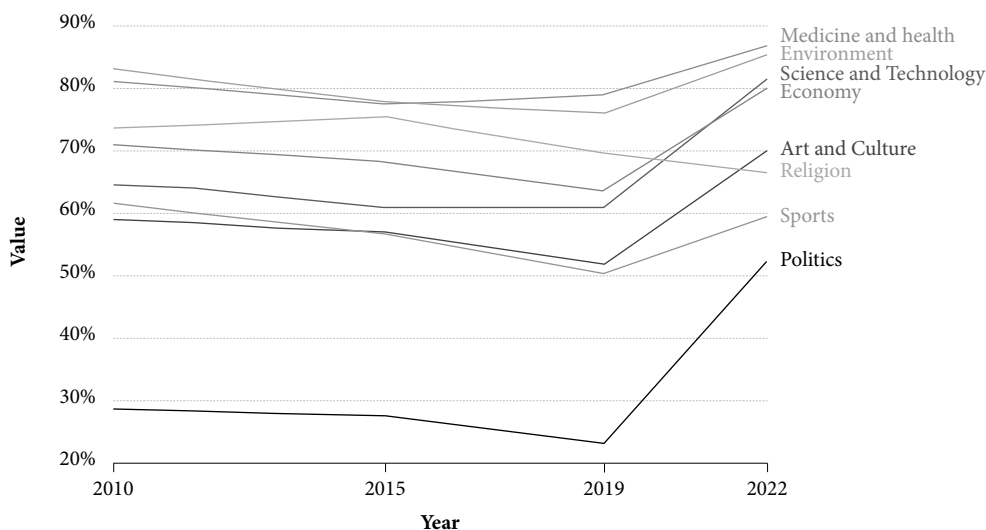
and economy (80%). When analyzing the data from 2022, grouping together those who claimed to be “interested” or “very interested”, the areas that showed the highest growth in the 2019-2022 period were science and politics. It is important to mention that the 2022 results reveal the highest level of interest for those themes in the entire historical series (Figure 1A).

The considerable increase in the population’s interest in science and politics, however, is not homogenous. Those who are more interested in science and politics have a higher level of education and income (college education and income above five minimum salaries). Even more relevant is the significant increase in interest regarding science among those with a lower level of education and income: 65.6% of those with Elementary education and 73.5% of those with income of up to one minimum salary. In 2019, the percentages were 49% and 50.6%, respectively (Figures 1B and 1C). A variation with little significance was noticed regarding religion.

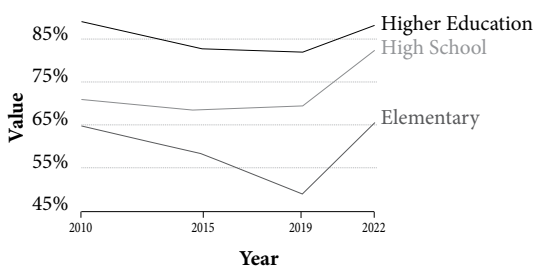
It is also important to mention the sharp decrease in the number of those who claimed to be “not interested at all” in science. Contrasting with previous surveys, which since 2010 had reached approximately 15%, in 2022, there were only 2.7% who showed no interest in the theme, which could possibly indicate that nearly all of the Brazilian population has some interest in science. Although there has been an expressive growth in interest in politics, the theme appears as an issue of least interest, indicated only by 52% of the interviewees, and with an even lower proportion among those with lowest levels of income (up to one minimum salary (MS), 43.9%) and among those with a lower level of education (complete elementary school, 33.9%).

In one of the most critical moments in history, data shows that science has stood out in the public debate, and the increased interest of the population is related to the current political-social scenario in the country. Social Sciences, since their early days, discuss the relationship between science, politics, and society, and analyze how biopolitics is present in science and how science has established control systems over social groups<sup>18</sup>. Such relationships depend on the historical, cultural, economic, and geographic contexts. The game involving science, power, and capital has been ongoing for some time, but this debate is not within the scope of our study. However, it is important highlight the way in which science has expanded its ability to transform and control nature, communities, and bodies, and has played roles in racial, sexist, and colonial dom-

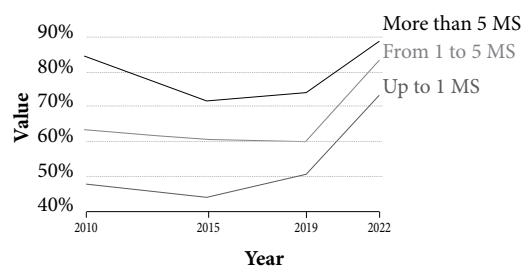
(A) Percentage of interviewees who claimed to have “interest” or “great interest” in the many themes in this study



(B) Percentage of interviewees who claimed to have “interest” or “great interest” in Science and Technology – by level of education



(C) Percentage of interviewees who claimed to have “interest” or “great interest” in Science and Technology – by level of income

**Figure 1.** Interest of Brazilians in different themes – in the historical series.

Source: Centro SoU Ciência, 2022.

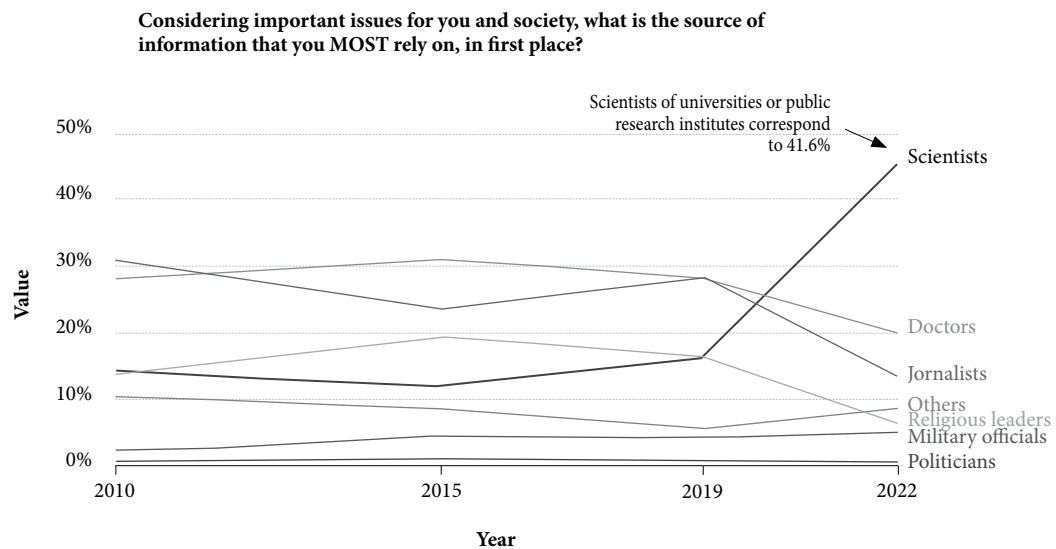
ination, supporting some of the most perverse and deadly theories in human history, such as eugenics. However, thanks to democratic progress and the establishment of a global, more collaborative, plural, and inclusive university research network, science has become more aligned with the struggles for human rights and the protection of life. We have recognized that science interferes directly in our lives and deaths, and the pandemic exposed the political dimension of public health and science at a moment of tension for democracy.

#### Credibility attributed to scientists

Another question from POS 3, which brings information corroborating with the hypothesis of

a pro-science wave, with the same formulation as the CGEE/MCTI series, treated the level of credibility attributed to scientists. Among ten professions (journalists, doctors, politicians, military, religious, artists, writers, environmentalists, and scientists from public institutions and private institutions), there was an expressive increase in credibility towards scientists.

In 2019, scientists had the same level of credibility as religious professionals and were below the level attributed to doctors and journalists. In 2015, they ranked fourth. However, in the data from the 2022 survey, scientists from public institutions reached 41.6% of the preferences, clearly ranked in first place. In comparison with the 16.3% found in 2019, scientists showed an increase of 253% (Figure 2).



**Figure 2.** The population's trust in different professionals – in the historical series.

Source: Centro SoU Ciência, 2022.

It is interesting to note the contrast between scientists and religious leaders, considering that the latter showed a considerable decrease in preference among the respondents in recent years. In the 2015 survey, religious leaders were the preference of 19.5% of the interviewees, whereas by 2022, they had lost 1/3 of their prestige, cited by only 6.5% of the interviewees. Trust in politicians remains very low (less than 1%), suggesting that recent Brazilian interest in politics does not result in an increase in the prestige of politicians, even in a politically polarized society. That was the case for military leaders as well. Although lately they have taken on positions in civilian government, with more space and visibility, their level of trust only reached 5%.

Increased confidence in scientists, notably those from public institutions and universities, indicates that science is not restricted to laboratories and experts, and they are receiving greater recognition from society<sup>19</sup>. The debate between denialism and science is not only restricted to the field of knowledge production; it is projected into the political arena as well, considering that the very right to life is at stake.

According to the words of Mbembe<sup>20</sup>, the federal government in Brazil opted for a “necropolity”, using its power to determine who should live or die and defining the individuals who are “disposable”. In the most critical period of the

pandemic, studies indicated that the highest vulnerability to the disease was intrinsically related to having the material conditions for prevention, such as access to clean water, sanitation, and the feasibility of social distancing<sup>21</sup>. With such disregard for economic and socio-spatial differences, the health crisis accentuated social inequalities, hitting the poorest population harder, whose deaths would be “acceptable”, according to statements from the federal government at the time<sup>22</sup>.

In the scenario of the health crisis, antagonistic positions arose in the country. On the one hand, the federal government and its ideological supporters, and on the other, the vast majority of scientists, SUS professionals, media, state governors, and mayors, who based their actions on scientific evidence, directives, and protocols by the WHO; on articles evaluated by other scientists; as well as on collaboration forums, which gathered universities, research institutes, and public officials (as was the case of the *Consórcio Nordeste* (Northeast Consortium))<sup>23</sup>.

In the scenario of disputes, scientists, university professors, and institutions (which gained more public exposure with the Congressional Investigation Committee on the pandemic) became relevant political actors, opposing the federal government and its setbacks. At the same time, the growth in interest for science and the increased confidence in scientists indicates po-

tential fields of consensus among antagonistic political opinions in a polarized society.

### Recognition of research institutions

The pro-science wave can also be seen in the form of the recognition of research institutions by the population. In 2022, in POS 4, replicating the question from the historical series, 42.2% were able to state the name of a research institution, primarily mentioning Instituto Butantan and Fiocruz (Figure 3). Recognition reached 67.7% of those who earned more than 5 minimum salaries, and 59.4% of those with a college degree. In 2019, only 9.4% knew the name of a research institution. The 2022 result is 5-fold higher than that in the survey conducted before the pandemic. Moreover, in the recent survey, only 26.2% knew the name of a Brazilian scientist, mainly mentioning Oswaldo Cruz and Carlos Chagas. That percentage is four times higher than in the 2019 survey, when only 7% were able to mention a Brazilian scientist.

The growth in interest for research institutions during the pandemic is noticeable in data collected from the Google search engine between January 2019 and February 2022. In Figure 3C, the research terms: Fiocruz, Butantan, Oswaldo Cruz, and Carlos Chagas indicated an evident “pro-science wave”, with a significant increase in the searches conducted in 2021, when vaccination against COVID-19 was beginning to be implemented in the country and the Congressional Investigation Committee in the pandemic was in place.

The data indicates that science and its institutions had reached a prominent position in the political debate during the pandemic, especially when faced with the need for scientifically supported and reliable information to deal with the new and tragic event that was affecting the entire population.

Research institutions and the scientific community played a key role in fighting the pandemic, regardless of the budget cuts in the area. Besides the research institutes, universities also expanded their actions, together with society, social organizations, and local governments, especially in areas which lacked public services. The panel: “Federal universities in defense of life”<sup>24</sup> defined more than one thousand actions in terms of: healthcare, research and technology, extension and solidarity, fighting hunger, support for employment and better income, and communication with society.

However, research indicates that the increased interest in science, the increased credibility of scientists, and the recognition of research institutes does not necessarily apply to public universities. There is little presence of “universities” in the word cloud produced by searches aimed at names of research institutions in the country (Figure 3B). Tension can also be seen in statements collected in focal groups, from people interested in science (the first group) and people opposed to public universities (the second).

The recognition of the importance of science became more evident during the pandemic, even among those who supported the Bolsonaro administration:

*I believe that science is everywhere, and after the pandemic, this became more than obvious [...] We need science in our daily lives. You saw how the vaccine was produced, if there were no scientists, motivated, studying, we would not have the vaccine today (group 1, pro-government, female, 28 years of age).*

In opposition, in relation to public universities, which are the place of most of the scientific production in Brazil, there is a lack of consensus and knowledge regarding their importance. In the debates, it is evident that being a Bolsonaro supporter influences perception regarding the theme. However, some of those government supporters also recognize the role of universities:

*I believe that in the universities [...] the public ones in this case, even though there are many issues with financing and less budget, I believe that in the public universities [...] science is present (group 1, pro-government, female, 28 years of age).*

*I think that the focus of the federal universities is scientific research, and the private ones, on the job market (group 1, pro-government, male, 30 years of age).*

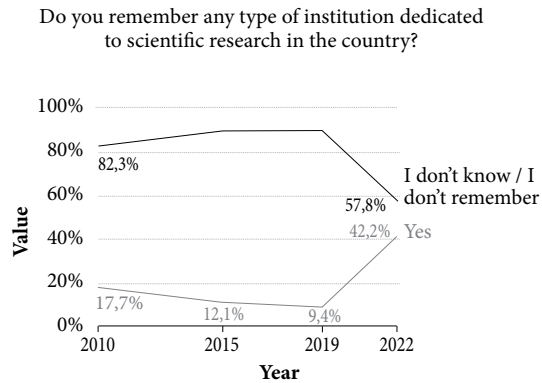
Among participants who were against public universities, the following statements were obtained after the participants saw the list of the best universities in Brazil, according to the international ranking from *Times Higher Education* (2022):

*That is a joke. This is just fake news (group 2, female, 37 years of age).*

*Of the 10 best universities, 8 are public? That is not real. Everything that is free, is worthless. If they were privatized, we would not be living like this. [...] You go to those schools and come out [...] totally left wing (group 2, male, 28 years of age).*

The same participant made the following comment after watching an institutional video about a federal university:

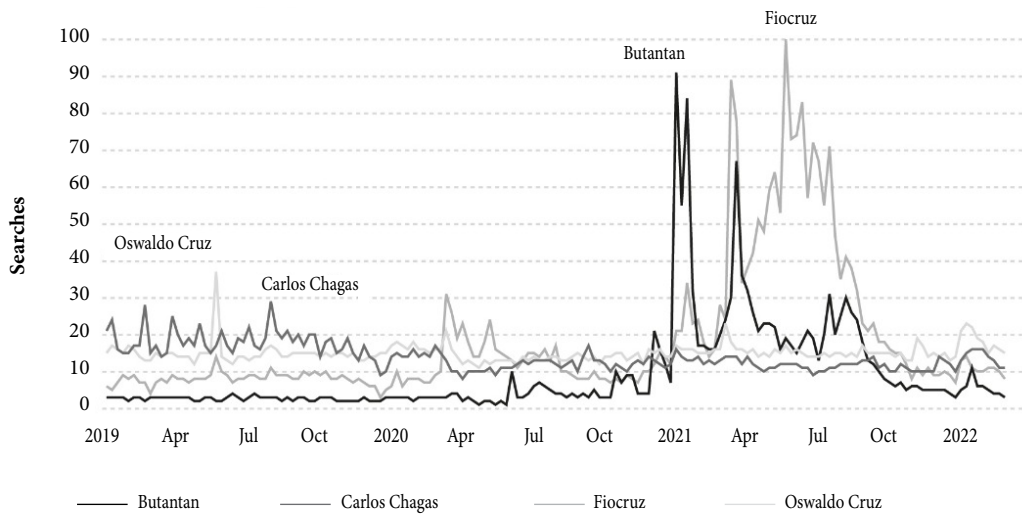
**(A) Percentage of Brazilian who remember some type of research institution in Brazil, from a public opinion survey**



**(B) Word Cloud**



**(C) Google searches per week from 01/01/2019 to 02/28/2022**



**Figure 3.** Recognition of research institutions in the historical series and in Internet searches.

Sources: (A) Centro SoU Ciência, 2022; (b) Authors; (c) Google Trends.



*We talk about universities, but sometimes forget that the researcher was born and raised in the university. It is sort of good to think about that. Not everything is the way that we think* (group 2, male, 28 years of age).

Regardless of the important increased interest and recognition of science, scientists, and research institutions, the data shows that society knows little about the theme. In POS 2, in an open-ended question (with spontaneous answers) about what public universities do in Brazil, 50% answered “research and teaching”. However, what concerns us the most is the fact that 36.1% did not know the answer. The lack of knowledge is more common among those with low levels of income and education, and those identified as “students”, above the age of 16. The percentage drops among the richest, above 6 MS (26%), and with college degrees (23%), indicating unequal access to knowledge.

In the subsequent survey (POS 3), we identified that the opinion about public universities is quite distinct among the respondents who evaluated the federal government as good/very good and its critics. The latter valued quality education (47.5%) and scientific research (69.2%), in contrast with the opinions by Bolsonaro supporters, who said that those institutions were places for indoctrination (31.3%) and trouble (26.7%).

#### **Evaluation of performance during the pandemic and investment in science**

The pandemic crisis impacted society in unequal ways, with a greater effect on the most vulnerable population, threatening jobs, resulting in gender violence, poverty, and hunger<sup>25</sup>. That scenario also affected public opinion about science during the pandemic and how it is presented in different social segments.

POS 5 showed that 50% of the population evaluated the way the Bolsonaro administration conducted the fight against the pandemic as bad or very bad (Figure 4A). Disapproval was higher among those with the lowest level of income (64% of the people with income up to 1 MS); younger individuals (aged 16 to 29 years) (59%); those with a lower level of education (58%); women (55%); and blacks (54%), which are more vulnerable segments of society and more dependent on public policies.

By contrast, those who considered the government’s performance to be good and very good have the opposite profile: a level of income above 6 MS (46%), with a college degree (36%), white

(34%), and 40 to 49 years of age (34%). These segments, in general, have more access to private health care and a higher level of education, as well as, in theory, to quality information, making them less vulnerable to the government’s wrongdoings during the pandemic. Not by chance, those with similar profiles supported the Bolsonaro administration and voted for his re-election.

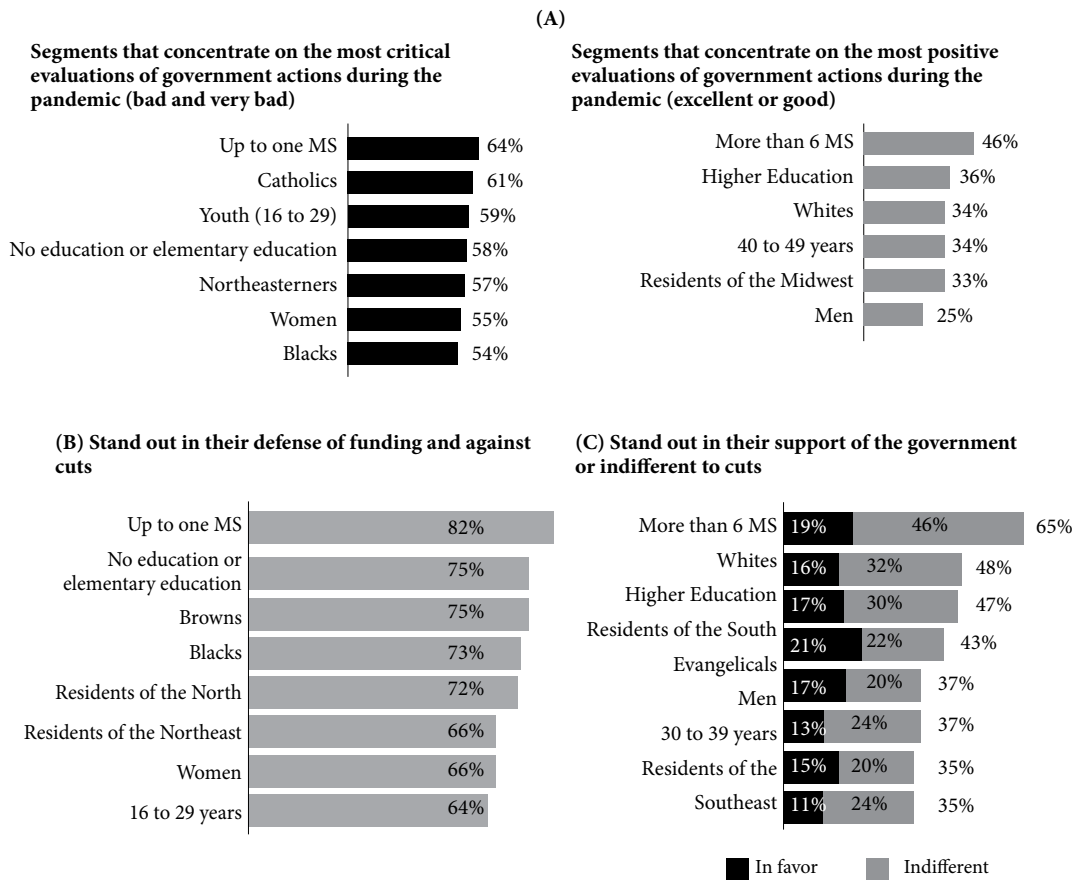
Regarding funding, in the survey conducted in 2021 (POS1), 62.1% positioned themselves against budget cuts for science. In the survey, 28% declared themselves indifferent or did not answer, especially those with lower levels of education and income, while 21.3% were favorable to budget cuts.

In the subsequent survey, from 2022 (POS 5), the same percentage (62%) were contrary to budget cuts for science and higher education. The new survey reaffirmed that most of the Brazilian population is favorable to investments in the area, while only 11% were in favor of cuts (a notable reduction of 10 percentage points in comparison with the previous survey).

In both surveys, income was the most relevant factor: The richest (above 6 MS) were in favor of budget cuts in the area: 13% in 2021 and 19% in 2022. This comparison also shows that the number of richest respondents who defended science and public universities (and were against budget cuts) had a significant reduction, dropping from 66% in 2021 to 27% in 2022.

The electoral-political context had a relevant impact, as the richest were those who gave a positive evaluation of the government. In the 2022 survey, among those who declared themselves as Bolsonaro voters, 19% were favorable to budget cuts, while among Lula voters, only 5% were favorable. Nevertheless, it is important to pay attention to the fact that 55% of the president’s supporters at the time were against cuts, three times more than those who support budgetary cuts. The information indicates a consensus among opposed political opinions regarding the importance of investing in science. The theme, therefore, may provide space for dialogue and cooperation in Brazilian society.

The results show that political polarization has to do with social class, income, and color. Interviewees who are most in favor of investments in science and research (Figure 4B) are mainly (according to 2022 data): the poorest (82% of those who earn up to 1 MS and 68% of those who earn 1 to 3 MS), with a low level of education (75% of those who were illiterate or had only an elementary education), black or brown (74% in average), from the North (72%) and the Northeast (66%)



**Figure 4.** Evaluation of the handling of the pandemic and of budget cuts in science by the federal government

Source: Centro SoU Ciência, 2022.

regions of Brazil, women (66%), and younger individuals (64%).

The overlapping with segments identified in the previous questions regarding the performance of the government in handling the pandemic is quite revealing. On the one hand, the most vulnerable segments are more critical of the government, and are those who began to value science and public policies during the pandemic. On the other hand, those who defend budget cuts or are indifferent had the opposite profile: income above 6 MS, (65%), white (48%), with a college degree (47%), from Southern Brazil (43%), men (37%), and evangelical (37%) (Figure 4C). The paradox which stands out the most is that the segments with the most access to information and higher education are those which support the destruction of science, research, and higher education in

Brazil. Only 6% did not know about the cuts, and 22% were indifferent.

Moreover, a considerable part of the population with the same profile (richest, with a higher level of education, white, and male), in a question about vaccination (POS 5, 2022), declared that they do not follow the scientific recommendations and refused to take the vaccine or had only one dose (without the necessary efficacy): 41% of the richest, 32% of those with a higher level of education, 29% of the whites, and 29% of the males. The same profile coincided with those who best evaluated the role of the government during the pandemic, although they were more capable of protecting themselves from the virus, when compared to the segments with a lower level of education and income, which were more exposed and vulnerable<sup>21</sup>.

The data shows an increasing detachment of the white elites in Brazil in relation to the university system that they themselves built in previous generations. It also indicates the prevalence of individualistic attitudes during the pandemic, riskier behavior, and denialism by the segments with higher levels of income. These are issues which deserve more specific analysis in future studies, but are not within the scope of the present study. It is important to remember that the first death by COVID-19 in Brazil was a domestic maid, exposed to the virus by her employers who had just arrived from Italy with the virus (in early 2020, one of the countries which most propagated the virus in the Western world)<sup>26</sup>.

Studies have revealed an emerging pro-science wave among the Brazilian population, especially within segments which have historically had no access to the universe of science and of higher education, and now, have begun to have more interest. It is important to recognize the pro-science profile and its dimensions of color and race/ethnicity, in order to guide public actions. The policy of quotas, by guaranteeing 50% of the places in universities to individuals who attended public high schools, expanded the access of blacks and indigenous people to college education<sup>9</sup>. The data reveals that those are specifically the segments which most support science now. This fact brings to science the challenge of expanding the understanding regarding the problems of the majority of the Brazilian population, especially those who are black, indigenous, poor, and less educated, who currently constitute a civilization vector against barbarism. In face of the destruction of the country's university system, supported by the elites, it is crucial to decolonize and de-elitize Brazilian universities, and defend them against demeaning accusations.

### **Information and communication about science and public universities**

In the current context of the “overabundance of information”, political quarrels have brought to light the issue of trust in science and in the universities, with narratives that often create a clash between scientific knowledge itself and the democratic institutions<sup>27</sup>. The conflicts included the persecution of scientists and university professors, and many had to leave the country, as they were suffering threats against their scientific work<sup>28</sup>. That reveals the connection of scientific denialism with radical right-wing movements, which “use hatred as their policy” and transform

the adversaries into enemies to be destroyed. Scientists, however, are becoming relevant actors in the political arena.

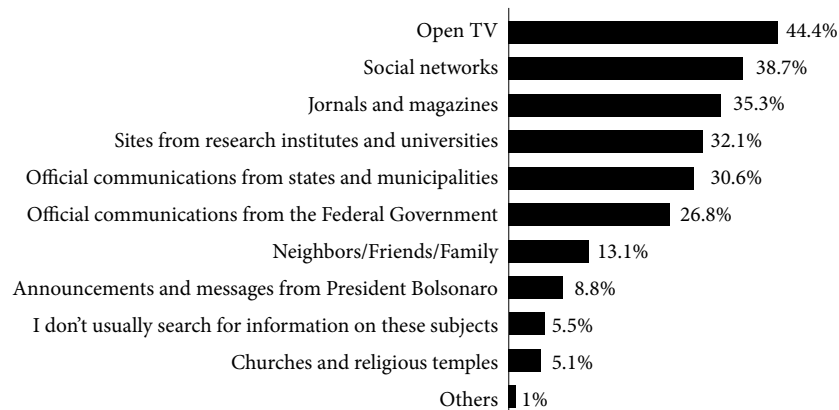
The pro-science wave identified in this study is associated with an active role of scientists and scientific communicators during the pandemic. Faced with negligence and a lack of guidance supported by scientific evidence by the federal government, scientists have sought more direct contact with the population and with different spheres of government, creating new formats for the scientist-population relationship, with more capillarity, a faster circulation of information, and more dialogue, thus contributing to the popularization and de-elitizing of access to science<sup>29</sup>. Research conducted with digital media indicates the growth in channels, profiles, and publications by scientists, and the population's engagement and interest in scientifically produced information<sup>30</sup>.

In the 2021 survey (POS 1), in the question: “What are the formats of information you consider most interesting to receive information on the pandemic, health, and science?”, the majority of participants (61%) considered open TV programs as the best way to access scientific information (Figure 5B). It is interesting to notice that the population which opposed the Bolsonaro administration is even more favorable of that format (72.4%), in comparison to 41% by its supporters. The survey showed that 39.8% of the respondents had an interest in “scientific articles”. However, it is important to clarify that the focus groups indicated that those “articles” may be simply news reports that mention data produced by scientists or researchers.

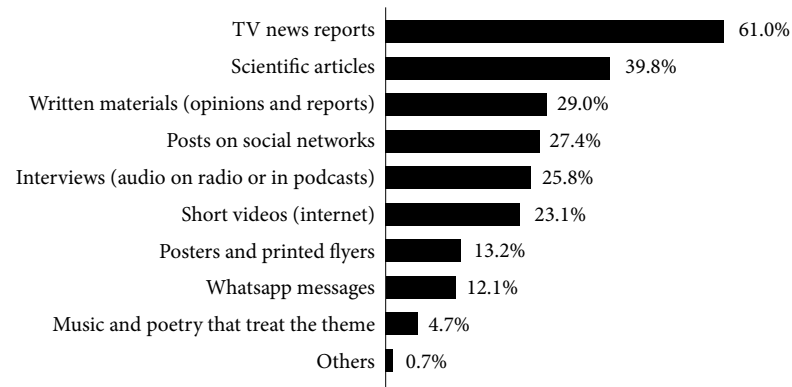
Regarding universities, in spontaneous responses (not stimulated) to the question: “What would you like to know about Brazilian public universities?”, transparency in the use of resources ranked in first place, 11.4%, rising to 20% among respondents with higher levels of education and income, and who were pro-Bolsonaro. Ranked second was the demand for information regarding the quota policy, access to and permanence in universities (9.9%), with this interest being higher among the critics of the government (12.9%) than among its supporters (3.5%), and even higher among those who were unemployed or had no income (15.4%). Concerns about the budget cuts and their impacts was the third most mentioned issue (6.8%), followed by “what interests the students the most” (12.7%).

When thinking about the “21st Century University”, Santos<sup>4</sup> proposed a creative, democratic and emancipatory reform, whose “cen-

## (A) Where do you search for reliable information about the pandemic, prevention, treatment, and vaccines?



## (B) What are the formats of information you consider the most interesting to inform yourself about the pandemic, health, and science?



**Figure 5.** Sources of information about science.

Source: Centro SoU Ciência, 2022.

tral objective is to respond positively to social demands for the complete democratization of universities, thus ending the history of exclusion of social groups and their knowledge<sup>4</sup> (p. 51). The pro-science wave in the pandemic may be a window of opportunity to reposition the role of public universities in the process of the collective resolution of social problems, expanding access and articulation with politically organized society and social organizations, in such a way that it can become effectively popular.

### Final considerations

The analysis of the survey question: “Did the COVID-19 pandemic change the perception of

Brazilian society about science, scientists, and universities?” showed that science, scientists, and institutions play a key role in the Brazilian public perception, indicating more interest of the population in the theme, more trust in scientists, and greater recognition of research institutions. In face of the catastrophe of hundreds of thousands of deaths, a significant part of the Brazilian population (of different classes, gender, races, and ethnic groups) began to seek information based on scientific evidence.

Nowadays, after the most aggressive period of the pandemic, with more than 690,000 deaths, and with the vaccines being effective and protecting the population, we wonder: “Is this pro-science wave going to last?,” and: “How can it continue, impacting generations and contributing to

public policies?"; "How can we maintain the new level of interest in science and mobilize the country, together with a social force that can oppose obscurantism and the threat to democracy?"

With the public debate nowadays reverting to a focus on economic issues, unemployment, and poverty, how can the universities in Brazil continue to contribute to the fight against important problems such as food insecurity, global warming, precarization of labor, and other problems caused by the current productive system that is destroying the planet and its inhabitants? As Santos, 2020<sup>31</sup> argued, to what extent did the "cruel pedagogy of the virus" help us learn long-lasting lessons? To what extent has it produced episte-

mological, cultural, and ideological changes in order to create new articulations at the political, social, and economic levels in order to fight for rights, ways of life, production, and labor?

To keep the pro-science wave from disappearing after the COVID-19 pandemic, and to maintain Brazilian science and universities working for the protection of life and for the reconstruction (or better, the re-invention) of Brazil in the post-Bolsonaro era, it is essential that policies be reconstructed to support the funding of science, higher education, and research, based on improving the dialogue and articulation with the majority of the population and encouraging the effective participation of Brazilian society in all its diversity.

## Collaborations

VM Sígolo: contributed with the project design, data collection and analysis, conception, writing and final revision of the draft. J Percassi: contributed with the project design, data collection and analysis, conception, writing and final revision of the draft. PF Arantes: contributed with the project design and supervision, data collection and analysis, the conception, writing and final revision of the draft. H Sano: contributed with data analysis and critical revision of the draft. M Moura: contributed with data collection and analysis, and critical revision of the draft. D Foguel: contributed with the project design, data analysis, conception and critical revision of the draft. SS Smaili: contributed with the project design and supervision, data analysis and critical revision of the draft. A Chioro: contributed with the project design and supervision, data analysis, conception and final revision of the draft.

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