

THE EFFECTS OF THE HIGHER EDUCATION EXCHANGE PROGRAMS ON THE ELITES' IMAGE OF BRAZIL

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This article reflects on the Brazilian educational and scientific diplomacy programs, Program for Partner Undergraduate Students (Programa de Estudantes-Convênio de Graduação – PEC-G) and Program for Partner Graduate Students (Programa de Estudantes-Convênio de Pós-Graduação – PEC-PG). The first section stands on documental analyses to fund the claim that the program was designed and functions as a soft power tool. In the suit, the article moves on to quantitative analysis aiming to explore the effects of the programs on the recipients' image of Brazil. Although the country's image has suffered due to the political and economic crises, the recipients of the programs reported a less negative image of the country than their peers who were not part of the program.

Keywords: scientific diplomacy; education diplomacy; soft power; Brazil.

OS EFEITOS DOS PROGRAMAS DE INTERCÂMBIO NA EDUCAÇÃO SUPERIOR NA PERCEÇÃO DAS ELITES SOBRE O BRASIL

Este artigo reflete sobre as estratégias de diplomacia educacional e científica do Estado brasileiro, Programa de Estudantes-Convênio de Graduação (PEC-G) e PEC de Pós-Graduação (PEC-PG). A primeira parte do artigo dedica-se à análise documental para estabelecer as bases da interpretação dos programas como estratégia de *soft power*. Em seguida, é utilizada análise quantitativa para avaliar o efeito dos respectivos programas na imagem do Brasil por parte dos receptores dos benefícios. A análise mostrou que, apesar da imagem negativa compartilhada, os beneficiários dos programas possuem uma imagem do Brasil superior àqueles que não fizeram parte do programa.

Palavras-chave: diplomacia científica; diplomacia da educação; *soft power*; Brasil.

LOS EFECTOS DE LOS PROGRAMAS DE INTERCAMBIO EN LA EDUCACIÓN SUPERIOR EN LA PERCEPCION DE LAS ELITES SOBRE BRASIL

Este artículo estudia las estrategias de diplomacia educacional y científica del Estado brasileño, Programa de Estudantes-Convênio de Graduação (PEC-G) y PEC de Pós-Graduação (PEC-PG). La primera sección del artículo utiliza análisis documental para sostener el análisis de que los programas fueron diseñados y siguen siendo una herramienta de *soft power* brasileño. La segunda parte, utiliza el análisis cuantitativo para evaluar el efecto de los programas en la imagen de los

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participantes sobre Brasil. Aunque el país sea mal percibido de manera general, los participantes de los programas muestran una imagen menos negativa del país cuando comparado a aquellos que no participaron del programa.

Palabras clave: diplomacia científica; diplomacia de la educación; poder blando; Brasil.

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1 INTRODUCTION

This article analyzes how Brazilian international scholarships granted to international students through the Program for Partner Undergraduate Students (Programa de Estudantes-Convênio de Graduação – PEC-G) and Program for Partner Graduate Students (Programa de Estudantes-Convênio de Pós-Graduação – PEC-PG) impact long-term the perception of these students about Brazil.

We argue that these scholarships could be thought of as soft power tools that use science to promote national interests, also called science diplomacy. The PECs represent more than a strategy to promote the development of countries of the Global South: they are science diplomacy instruments (Ferreira and Oliveira, 2020). To support this analysis, we conducted an online survey with international students currently studying or that have previously studied in Brazil. This survey compared the perception of students who received the PEC scholarships with those who did not receive them, to evaluate the impact of granting this benefit on their perception of the country.

Recently, the international relations literature has referred to international scholarship programs focused on graduate education as science diplomacy (Ferreira and Oliveira, 2020). Some authors specialized in evaluating higher education scholarships to international students, a very common instrument in developed countries, divide their specific objectives into two broad categories: i) development grants: for humanitarian purposes (usually funded by government departments that work with international assistance); and ii) public diplomacy/soft power scholarships: for political purposes, such as the creation of long-term bilateral relations and positive feelings towards donor countries (grants usually funded through foreign policy-related departments) (Mawer, 2014).

Despite these divisions, these goals are not mutually exclusive, and scholarships generally include development and public diplomacy goals. Therefore, it is to expect that many of the observations and conclusions relevant to one of the purposes to be relevant to the other. Another essential aspect for the evaluation of international scholarship programs, especially those designed to be

both a development and a foreign policy tool, will be measuring the students' rate of return to their countries of origin and the factors involved in this trend since the return is required for fulfilling both objectives of international scholarships.

In any case, it is necessary to evaluate them constantly to ascertain whether these international scholarships achieve their objectives, measuring the success of the strategy. Moreover, the program may be reformulated based on the information obtained from the study of these evaluations. The *Commonwealth Scholarship Report* (2016) shows that high-income countries usually fund international scholarships because of investment. However, middle-income countries such as Brazil have increasingly deployed granting scholarships. Unlike the grants awarded by high-income countries, though, there is a lack of evaluation data on scholarships in these countries. Since one of the objectives of the PECs is to impact positively the students/researchers' perceptions about Brazil, this research intends to help fill this gap by providing this answer.

2 INTERNATIONAL HIGHER EDUCATION SCHOLARSHIPS: SCIENCE DIPLOMACY AND SOFT POWER

International scholarship programs for higher education allow thousands of people worldwide to study outside their country of origin every year. These initiatives are supported by governments, supranational organizations, and charities as part of both public diplomacy and development assistance commitments (Mawer, 2014).

Scholarship providers/donors increasingly invest in evaluating the results of these systems by analyzing the trajectories of students and alumni during and after the scholarship to assess their progress toward the objectives of the scholarship program policy. According to the *Commonwealth Scholarship Commission* report (Mawer, 2014), despite the high importance of evaluation practices to understand the results and to ensure renewal of funding, few analyses have been conducted on the evaluation practices employed in scholarship programs.

As discussed earlier, international scholarships for higher education are very common in developed countries, and their objectives can be divided into *development grants* for humanitarian purposes – usually funded through State departments acting to assist the development of other countries; and *public diplomacy/soft power grants* with political objectives, such as creating long-standing relations between the donor and the recipient country and fostering positive feelings towards the former – normally funded through State and foreign affairs departments (Mawer, 2014, p. 2).

Although these objectives are not mutually exclusive, for scholarships usually involve both development and public diplomacy goals, I have restrained my analysis to the latter, as this research evaluates the use of PEC-G and PEC-PG international scholarships as a tool of public diplomacy/soft power.

3 PUBLIC DIPLOMACY AND SOFT POWER

According to Melissen (2005, p. 4), public diplomacy is one of the most important instruments to soft power. Key words, following a traditional school, defines public diplomacy as the attempt of an international actor to conduct its foreign policy by engaging with foreign publics, therefore, a government-to-people action. However, as Villa (1999), scholars have recently pointed to the new configuration of the transnational arena as a more horizontal structure that gives space to emerging non-governmental actors in public diplomacy because of new technologies available, as discussed in chapter 1.

To understand public diplomacy, it is necessary to appropriate some conceptual distinctions made by Nye (2008) between public diplomacy and soft power – herein, the *soft forms of power*. Understanding power as the ability to obtain certain conduct from others to achieve desired results, I will mainly deal with soft forms of power – or simply *soft power*, as per the terminology introduced by Nye.

Soft power would then be the ability to shape the preferences of others, causing them to perform certain actions without the use (or threat of use) of economic or military force to coerce them. This means using attraction instead of coercion and payment.⁵ According to Nye (2008, p. 95-96), not only is soft power the power to persuade; it is also the power to attract and seduce: it is the power of attraction in behavioral terms. Moreover, it is also important to note that, according to Nye, soft power, that is, a country's capacity to attract others, has three main sources/resources – when it is legitimate: the attractiveness of its culture and its knowledge; its political values; and of its foreign policy (in terms of practices and policies). Still, according to Nye (2008, p. 95), public diplomacy, on the other hand, is an *instrument* that governments use to mobilize power resources, including soft power, in order to attract audiences from other countries – and not specifically governments.

At this point, the specification made in the first section as to soft power being a capacity and the difference between resource and result become essential for the analysis: if the contents of power resources (in the case of soft power, culture, values, and policies) are not attractive, then public diplomacy does not produce soft power – and perhaps produces the opposite effect.⁶

Thus, Nye (2008) and Leonard, Stead and Smewing (2002) divide public diplomacy into three complementary dimensions: the first and most immediate one relates to daily communication about government decisions in both

5. "Payment", here, refers to the payment of pecuniary advantage against specific advantages. The problem of legitimacy of monetary incentive will be dealt with on the basis of Grant (2006; 2012). According to Grant, incentives have varying degrees of legitimacy, since "I can also give you something that you want in exchange for your compliance with what I want. Coercion, persuasion, and bargaining are alternative forms of power. Each is sometimes legitimate and sometimes not" (Grant, 2006, p. 30).

6. In epidemiology, the term "iatrogenesis" describes a healing activity that produces undesired effects.

domestic and foreign policy; the second is dedicated to strategic communication on specific themes, as in political campaigns; the third dimension – which is the main focus of this research – is the one that creates and fosters long-term relationships with key individuals through, for example, scholarships, exchange programs, seminars, and conferences.

Another important point about public diplomacy important for the central argument of this text is that it is not just about attracting the public from other countries by promoting the image of a particular country in a positive way – through the production of information and the generic projection of a positive image. Public diplomacy, especially in its third dimension, is also founded on building long-term relationships, especially with key individuals who can create a positive environment for government policies.

Consequently, public diplomacy can be conceptualized as a way for a government to exercise power by attracting the audience from another country, making them want the same projects as the country's nationals. The *effectiveness* of public diplomacy, therefore, rests on the attraction for the creation of shared values between the issuer and the recipient, which guarantees the *legitimacy* of these policies.⁷

Given that soft forms of power linked to co-option require shared values, they are considered a two-way street (Nye, 2008, p. 103): the effectiveness of public diplomacy increases when, besides issuing information, a country is also able to hear its interlocutor. This allows the issuer to access the way information is being received and understood and thus to fine-tune their relationship with the audience.

For these reasons, and refining what has been discussed so far, the focus of this research leans on the third dimension of public diplomacy as defined by Nye, considering that international scholarships are a tool for building long-term relationships with key individuals. Some of the most used forms of public diplomacy are those related to education, science, and technology through scholarships, exchange programs, research projects, seminars, and conferences.⁸ Consequently, the third dimension of public diplomacy relates to the concept of education and science diplomacy.

4 SCIENCE AND INNOVATION DIPLOMACY

Domingues (2018) affirms policies linked to education, science, and technology activities have historically stimulated integration among nations and reinforced

7. Shared values are an assumption of legitimacy that will be addressed later as the foundation of authority and incentives.

8. One of the results of these strategies is the emergence of scientific diplomacy, defined as a strategy used by political actors to stimulate scientific interaction among nations, reinforcing partnerships, proposing solutions to common problems and building knowledge (Fedoroff, 2009; Royal Society, 2010).

long-lasting partnership ties, in line with the third dimension of public diplomacy and the concept of science diplomacy.

Turekian and Lord (2009) define science diplomacy as the “scientific cooperation and engagement with the explicit intent of building positive relationships with foreign governments and societies.” Some examples of the use of science as a diplomatic tool are: i) the interactions between the Weizmann Institute of Israel and the Max Planck Society of Germany in the 1950s helped establish diplomatic relations between the two countries, paving the way for a historic agreement in 1964 between the countries, which facilitated the transfer of funds from Germany to Israel; and ii) in the years following the Cold War, the North Atlantic Treaty Organization (Nato) – through its scientific committee – initiated talks to create a new educational institution for the training of scientists and engineers from Eastern European countries. Although the institution was never created, this spirit of integration would have contributed to the formation of the European Union⁹ (Skolnikoff, 2001).

In light of the concepts of scientific diplomacy and public diplomacy, Fialho and Wallin (2013, p. 7), as well as several scientific journals and national webpages,¹⁰ consider scientific diplomacy as a subtype of public diplomacy. Moreover, they claim that science is a universal language and, therefore, is an important instrument for bringing nations together.

Because science is a universal language, science diplomacy is one way to make a positive impact and foster dialogue while leaving politics aside, particularly between countries with strained relationships (Fialho and Wallin, 2013, p. 7).

For the same reasons, exchange programs and scholarships are standard tools for bringing countries together: not only science in the strict sense – with projects and professional researchers, but also science as education, training future scientists, politicians, and workers, is an universal language.

In this sense, scholarship programs that enable the exchange of students – considered in this research as future political elites, scientists, and decision-makers in the private sector – are one of the main contemporary instruments of public/scientific diplomacy. Nye (2008), for instance, stresses the importance of exchange programs in the formation of leaders such as Helmut Schmidt and Margaret Thatcher, who have participated in US programs. Similarly, the report by The Association of Commonwealth Universities points out students such as Álvaro Uribe Vélez (president of Colombia), Reid Hoffman (founder and Chief Executive Officer – CEO of

9. Although the institution recognized science and technology as a tool for social development, its true goal was to increase European integration, connecting the countries of the East with those of the West in order to increase the power of the capitalist bloc.

10. Examples are available at: <<http://dfat.gov.au/people-to-people/public-diplomacy/Pages/science-diplomacy.aspx>>, <<http://uscpublicdiplomacy.org/blog/science-diplomacy-age-globalization>>, <<http://www.sciencediplomacy.org/author-info>>, and <<http://www.aaas.org>>. Accessed on: June 25, 2022.

LinkedIn), and Wang Lili (executive director of the Industrial and Commercial Bank of China), who received scholarships from the United Kingdom.

According to Nye's concept, the main focus of public diplomacy is reaching the public of other countries. However, when it comes to establishing long-term relationships, the use of policies related to education, science, and technology are the most common. Next, I discuss four factors that may explain this option.

The first political factor relates to the very history of modern education: the constitution of the modern State. According to Hamilton (2012, p. 69), the idea that school training was an instrument of great value to the church and the State comes from the Hoole (1913), in *A New Discovery of the Old Art of Teaching School*. Schools would give political support to the State and the church, causing their members to perform their "correct" function, according to the assumptions of these institutions.

The second factor concerns the logic of knowledge and technology development itself. Education, science, and technology are eminently collective activities, which depend on prior knowledge to be developed as either continuity or rupture.

The third economic factor is linked to the pattern of international trade, both in production and consumption, and has undergone profound transformations: companies began to distribute their operations around the world, from the purchase of supplies and product design to the manufacture of parts, assembly, and marketing. Truly international production chains have been created, which also require a standardization of knowledge/education that allows for efficient synchronization of the so-called global/regional value chains.

Finally, the fourth factor: these policies focus on higher education (undergraduate and graduate) and science and technology activities, which form teachers and decision-makers who will occupy strategic positions in schools, universities, companies, institutions, and governments. These individuals are key to the dissemination of ideas to groups of people in their countries, and therefore can be considered vectors of public diplomacy/soft power.

5 THE OBJECTIVES OF THE PROGRAMS FOR PARTNER STUDENTS: PEC-G AND PEC-PG

Science, technology, and innovation are considered power resources in IR from both hard¹¹ and soft power perspectives. The use of science and education as foreign policy tools was usually associated with developed countries. However, major developing countries have been increasingly designing strategies adapted to the new transnational arena, constantly modified by technological transformations.

11. Hard power and soft power are usually described in the IR literature as distinct forms of exercising influence over another state by military and economic power or cultural and educational influence, respectively.

Those strategies include scientific and educational agreements that aim, among other objectives, to exchange knowledge and shape public opinion.¹²

Moreover, per a study of research methodology presented by the Commonwealth Scholarship Commission in the United Kingdom, there is a lack of evaluation data on countries which are not part of the Organisation for Economic Co-operation and Development (OECD) regarding the use of international scholarships to this end. One of the most recognized – but scarcely evaluated – strategies is developed by Brazil, that offers educational opportunities to international students – preferably from developing countries – through two programs: the PEC-G and the PEC-PG.

Under PEC-G, students can take their undergraduate studies in Brazil for free. Moreover, in cases related to merit or economic needs, Brazil may provide funds for these students after the first year of study. The Brazilian government also provides these students with return tickets to their country of origin in some cases – an strategy aimed at certifying that these students will go back to their origin countries, becoming potential points of contact for Brazil. The PEC-PG program is slightly different: since it is focused on graduate students – and, therefore, on research and knowledge production, not only does it offer the course for free, but it also comprehends a grant in the same value received by Brazilian students, as well as the return tickets.

Currently, both programs are part of the Brazilian Cooperation for International Development (Cooperação Brasileira para o Desenvolvimento Internacional – Cobradi). According to the last report released in 2013 by the Brazilian Agency for Cooperation (Agência Brasileira para Cooperação – ABC) and the Ipea on Cobradi, this policy is classified as educational cooperation. Still, as argued above, it should be understood as scientific diplomacy (Flink and Schreiterer, 2010).

The official discourse stresses three main lines through which education is used as a foreign policy tool. Culturally, it fosters people from different backgrounds, enhancing mutual understanding and tolerance. As a cooperation, it intends to help other global South countries develop by qualifying their human capital, which would help attract foreign investment and technology. Furthermore, politically, it tries to *construct* Brazil's image as an essential factor to these foreign citizens, projecting the country in the transnational arena and its ideas, values, and discourse.

12. It is essential to highlight that graduate education should also be understood as bridging the gap between scientific and educational diplomacy (Flink and Schreiterer, 2010), especially in cases like Brazil, where graduate students conduct most scientific research (Almeida and Guimarães, 2017).

Those three perspectives make higher education an important asset for Brazilian foreign policy, aligned with the traditional Brazilian diplomatic discourse in the transnational arena – until 2018, at least. However, what matters the most to our hypothesis here is the political perspective of the policy – which is, nevertheless, intertwined with the other two, in agreement with the traditional Brazilian diplomatic narrative of solidarity among countries.

In this sense, the Brazilian National Graduate Plan (Plano Nacional de Pós-Graduação – PNPG) 2011-2020 released in 2010 stated that the internationalization of higher education is a strategy that intends to influence the transnational arena and, literally, “to increase Brazil’s role on the international scene” through qualified human capital.

This statement allows us to conclude that Brazil has a mixed foreign policy that aims to foster development but, at the same time, benefit from it by having developing countries’ elites connect with the country: a foreign policy towards soft power/influence. This is also deductible from the organization of the programs since the Ministry of Foreign Affairs (Ministério das Relações Exteriores – MRE) occupies an important position in both administrations. The management of the two programs is shared among ministries, reflecting the complexity of the programs and their goals.

As already mentioned, the Division of Educational Themes of the Brazilian MRE shares responsibilities with the Ministry of Education (MEC) in managing PEC- G; and with MEC, through the Coordination for the Improvement of Higher Education Personnel (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior – Capes) and the Ministry of Science, Technology, and Communication (Ministério da Ciência, Tecnologia, Inovações e Comunicações – MCTIC) through the National Council of Technological and Scientific Development (Conselho Nacional de Desenvolvimento Científico e Tecnológico – CNPq) in managing PEC-PG.

Both programs were created during the dictatorship in Brazil (1964-1985): the PEC- G program was built in 1965, soon after the military coup in 1964 by the first military president of the period, president Castelo Branco, while PEC-PG was created during the last military government of the period, president Figueiredo’s, in 1981. Since then, they have been continuously updated, the last amendments being held, respectively, in 2013 and 2006, during the left-wing governments of the Brazilian Workers’ Party (Partido dos Trabalhadores – PT). During these administrations, PEC-G and PEC-PG received particular attention, in line with the cooperation policy heralded by them: the so-called South-South cooperation, which, as mentioned above, was thought of as being more horizontal than the preceding model, the North-South cooperation.

Brazil has been using culture, education, and science as foreign policy tools since the 1960s to spread Brazilian culture, create bonds, and build a good image before other

countries. Some of the most important expedients for such were Brazilian Cultural Agreements – the main focus of this research – in which the Brazilian Foreign Ministry would typically grant scholarships to international students. Many of these documents show a considerable influx of students from various countries, especially from Latin America and Africa (Ferreira and Oliveira, 2020). The policy itself is pretty old and survived all drastic changes in ideological orientation, indicating that the bureaucracy had an independent and steady line of action. Despite these changes, this policy was constant – and, to date, remains in place.

The cultural agreements, since their creation, were instruments used in favor of the political and economic interests of the country, since the Foreign Ministry considered education as a means for a foreign policy promotion and not as an end in itself. The objective of promoting a positive image of Brazil abroad was an important objective is also evident when the chief of the Culture and Information Department reports to the Foreign Policy Secretary his concern about the difficulties Nigerian students under cultural agreements had when trying to enroll in Brazilian universities (annex 2, doc. 17). He claims that this “could cause the worst impression on Nigeria, turning the scholarships counter-productive.”

With the increasing number of students since 1960 – around 600 students per year from other Latin American countries under cultural agreements. Doing the math, if the students were to stay around five years, the number of agreement students in Brazil would totalize 3,000 people to be managed by the Brazilian Foreign Ministry, revealing the necessity of systematization from the agreement signature to the end of the scholarship period. This led to the creation of PEC-G in 1965 to answer Brazil's interest in using science and education as a foreign policy tool embodied in cultural agreements. It aimed not only to tackle management issues but also to standardize and integrate the foreign educational policy with the political and economic interests of the country. Its soft power or influence features appear not only in signing individual agreements but also in creating the program itself.

As discussed above, Brazilian scholarships are attractive because most international scholarships available worldwide – the development-focused, the public diplomacy/soft power, and the blended scholarships – are funded by developed countries. Not only because they require funds available to this end, but also because, according to many scholars, soft power aims to co-opt and seduce. Therefore, the primary goal of these policies would be to provoke emulation.

In its traditional concept, soft power is generally understood as a result of other power resources and, therefore, more likely to be deployed by developed countries. However, Brazil's case demonstrates that developing countries can deploy strategies designed to persuade potential allies towards common goals, enabling international action with legitimacy rather than interaction determined by material capabilities.

One of the main PECs' focuses is to influence the perception of the target public, considering education through a financial nature or not.

The main point that remains unanswered is: how do these programs impact the recipients' perception of Brazil? We intend to address this question with our survey.

6 SURVEY: INTERNATIONAL STUDENTS' PERCEPTION ABOUT BRAZIL

To gather the answers of foreign researchers and students, we used an internet platform called SurveyMonkey, sending an invitation through email to a database of 65,493 contacts. The survey was conducted in Portuguese based on two main assumptions: i) the students and scientists inscribed on Lattes Platform come from many different countries, however, considering that they have, at some extent, an experience in Brazil, it is more likely they will have some knowledge of Portuguese than other language, regardless their origin; and ii) the translation of the survey in different languages would enclose different or disputed meanings relatively to the answers, harming the analysis.

The e-mail database was created based on the Lattes Platform as of 2017 when they were available and public in the curricula. This platform has a filter for foreign researchers and students, which made the exploration easier, and the searching character used was a blank space. We changed the number of page exhibitions in the Uniform Resource Locator (URL) and downloaded the curricula with the emails to facilitate the process.

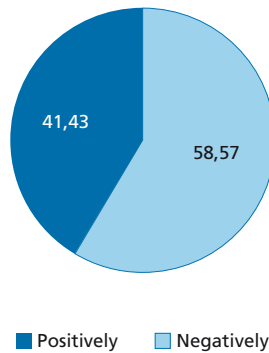
Therefore, in June 2019, we sent 65,493 invitations in 7 days, respecting the day-limit of SurveyMonkey: 6 days sending 10,000 invitations per day, and one day sending the last 5,493. Until June 24, the survey had been opened by 4,984 people or 7.6% of the total – which was above expected.

Nevertheless, out of these 4,984 students, only 65% completed the survey. Since we had a heterogeneous dataset containing all international students and researchers with a curriculum at Lattes Platform, we divided the survey into three main groups. The first primary division was between those who never studied in Brazil (G1) and those who did or were presently having an educational experience in Brazil (G2). This second group (G2), the group of students, was subdivided between those who are still students (G2.1) and those who had this experience in the past (G2.2): the division makes sense since the verb tenses used in the questions had to be different for them.

All three groups answered the page concerning the perception of Brazil and provided socioeconomic details. Nevertheless, only those who are/were students in Brazil answered the extended version regarding this experience – and the factors that could have shaped their perception (see the *Methodology* item).

The dependent variables relate to the perception international students and researchers have about Brazil. According to the survey, 58.57% of the 3,333 respondents have a current negative perception of Brazil.

FIGURE 1
In general, how do you currently evaluate Brazil's image?
 (In %)



Authors' elaboration.

Interestingly, among the 3,333 answers, 90.74% of the 2,339 respondents who had the experience as students in Brazil had a good image before their experience in Brazil. The tendency diminishes after their experience in the country, as shown in table 1.

TABLE 1
Comparison between previous and current perception of Brazil's image

		In general, how do you currently evaluate Brazil's image?		
		Negative	Positive	Total
Students of Brazilian educational institutions		Count	Count	Count
How did you evaluate the image of Brazil before living in the country as a student of a Brazilian institution of higher education?	Negative	150	65	215
	Positive	1,277	847	2,124

Authors' elaboration.

This indicates that the experience in Brazil plays an important role in the perception of all respondents. However, this research is concerned with the effect PECs have on this perception. Aiming to test the influence of PECs in the respondents' perception, three independent variables were created based on the answers received regarding their participation – or no – in the main Brazilian programs on education and research. In the first one, we oppose the PECs (589) to all the remaining respondents (2,769); the second opposes the PECs (589) to other Brazilian programs (1,490).

The main issue considered to create them was the fact that many who participated in PECs were also part of other Brazilian programs. To solve it, the PECs were a preponderant category, phagocytosing any other program. Finally, the third variable considers all Brazilian programs (2019) against the rest of the respondents (1,279). A description of the variables used in the regressions follows in table 2.

TABLE 2
Variables description

Name	Description	Type	Observations
Brazilian funding	Having participated in a Brazilian program on education and research: Capes, CNPq, PEC-G, PEC-PG, Fundações de Amparo à Pesquisa (FAPs) (1) All other respondents (0)	Binary	3,333
PECs1	Having participated in a PEC-G or PG (1) All other respondents (0)	Binary	3,333
PECs2	Having participated in a PEC-G or PG (1) Having participated in any <i>other</i> Brazilian program, different from PEC-G or PG (0)	Binary	2,055
Latin America	Residents in Latin America (1) Other respondents (0)	Binary	3,333
Gender	Female (1) Male (0)	Binary	3,333
Humanities	Studied social sciences, linguistics, literature, and arts in Brazil (1) Studied in other areas (0)	Binary	2,126
Duration	Time spent in Brazil (number of weeks)	Continuous	1,913
Southeast	Studied in Southeast (1) Other regions (0)	Binary	1,940
Age	Age (years)	Continuous	1,845

Authors' elaboration.

To elucidate this point, a new variable was created opposing the participants of PECs to those who took part in other Brazilian programs. A *t*-test was performed to compare the perceptions, and the results are presented in table 3.

TABLE 3
T-test on the difference of perception about Brazil
(In %)

In general, how do you evaluate Brazil's image currently?	PECs2	
	Other Brazilian programs	PECs
	Column N	Column N
Negative	62,9 _a	56,3 _b
Positive	37,1 _a	43,7 _b

Authors' elaboration.

Obs.: 1. Values in the same row and subtable not sharing the same subscript are significantly different at $p < .05$ in the two-sided test of equality for column proportions. Cells with no subscript are not included in the test. Tests assume equal variances.
2. Tests are adjusted for all pairwise comparisons within a row of each innermost subtable using the Bonferroni correction.

According to table 3, the PECs evaluation of Brazil's image is significantly more positive than the other group. This subject will be deeper explored in the statistical section, where logistic regressions will help to shed more light on the matter. Now, it is possible to elaborate some hypotheses on the results of tables 5 and 7, as follows.

- 1) The experience in Brazil contributes strongly to turning a positive perception of Brazil into a negative one. Nevertheless, the PECs influence this perception positively.
- 2) The survey was taken in 2019, amongst Brazil's political moment of high polarization and international exposure of scandals. Therefore, since the main goal is to compare answers of the students coming from different Brazilian programs, the results can present a bias, but a uniform one, affecting the answers globally. However, the PECs positively influence this perception.

7 INFERENCE ANALYSIS

The statistical analysis – which does not aim to demonstrate causality, only correlation between the variables of interest – uses three different models for each independent variable and logistic regression. The logistic regression, also called a *logit model*, is used to model dichotomous outcome variables. In the logit model, the log odds of the outcome are modeled as a linear combination of the predictor variables. Three tables were used to test three different independent variables using three models each, organized according to the number of observations for each variable, so as to keep a pattern in all tables.

The first independent variable tested is PECs2 (table 4): PECs compared to other Brazilian programs. The goal is to verify how that is correlated to the image respondents who are/were international students have about Brazil. PECs2 is highly significant (99%) and positively correlated to the positive image of Brazil in the first and the second model. The odds of having a positive image of Brazil increase by 43% and 52%, respectively. Living in Latin America behaves similarly (highly significant and positively correlated), and the odds of having a positive image increase to 90% in model 1 and 86% in model 2. In both models, gender is significant and negatively correlated. Studying humanities, in model 2, is highly significant and negatively correlated, and the Odds Ratio (OR) of having a positive image of Brazil decreases by 65% if the respondent studied a course in humanities.

In model 3, there is a decrease in the significance of PECs2, but the variable remains positively correlated, and the OR, steady. In this model, Latin America also is positively correlated but loses significance, and the OR also decreases. The variable humanities, like in model 2, is highly significant and negatively correlated.

TABLE 4
PECs and the perception of participants of other Brazilian programs

	Model 1		Model 2		Model 3	
	β	OR	β	OR	β	OR
PECs2	0.358*** (0.102)	1.43	0.423*** (0.112)	1.52	0.369* (.145)	1.44
Latin America	0.646*** (0.117)	1.90	0.621*** (0.128)	1.86	0.383* (0.167)	1.46
Gender	-0.273** (0.093)	0.760	-0.175* (0.102)	0.841	-0.221 (0.137)	0.801
Humanities	-	-	-1.06*** (0.115)	0.345	-1.16*** (0.163)	0.312
Duration	-	-	-	-	-0.0008* (0.0003)	0.999
Southeast	-	-	-	-	0.194 (0.128)	1.26
Age	-	-	-	-	0.008 (0.007)	1.00
Constant	-0.959*** (0.118)	-	-0.697*** (0.132)	-	-0.906*** (0.388)	-
Observations	3.333	-	2.126	-	1.155	-
LogLikelihood	-1350.25	-	-1165.58	-	-669.98	-
Pseudo R^2	0.01	-	0.05	-	0.05	-

Authors' elaboration.

Obs.: *** 99%; ** 95%; * 90%.

While table 4 compares the PECs perception with the students of other Brazilian programs, the main focus of table 5 is to test the correlation between PECs1-PECs participants against all respondents – and the positive image of Brazil. In the first model, only being resident in Latin America has a highly significant (99%) and positive correlation. Gender is significant (90%) and negatively correlated to the positive image of Brazil.

In model 2, two variables appear highly significant and positively correlated: PECs1 and Humanities. The odds of having a positive image of Brazil increase by 42% if the respondent is/was part of the PECs and 81% if they live in Latin America. The variable humanities is highly significant but negatively correlated, and the odds of having a positive image decline by almost 64% if the respondent studied any humanities course. In the third model, only the humanities variable continues highly significant for 70% of the odds.

TABLE 5
PECs and the perception of all respondents about Brazil

	Model 1		Model 2		Model 3	
	β	OR	β	OR	β	OR
PECs1	0.119 (0.093)	1.12	0.351*** (0.108)	1.42	0.334 (0.142)	1.39
Latin America	0.428*** (0.078)	1.53	0.595*** (0.118)	1.81	0.370 (0.158)	1.44
Gender	-0.204* (0.073)	0.815	-0.164 (0.095)	0.848	-0.200 (0.132)	0.81
Humanities	-	-	-1.01*** (0.103)	0.360	-1.19*** (0.154)	0.30
Duration	-	-	-	-	-0.0006 (0.0003)	0.99
Southeast	-	-	-	-	0.219 (0.129)	1.24
Age	-	-	-	-	0.008 (0.007)	1.00
Constant	-0.592*** (0.072)	-	-0.622 (0.120)	-	-0.845 (0.321)	-
Observations	3.333	-	2.126	-	1.155	-
LogLikelihood	-2241.85	-	-1344.31	-	-721.60	-
Likelihood ratio test	-	-	-	-	-	-
Pseudo R ²	0.0085	-	0.05	-	0.05	-

Authors' elaboration.

Obs.: *** 99%; ** 95%; * 90%.

Table 6 analyzes the perception of students from *all* listed Brazilian educational and research programs. Brazilian Funding is highly significant (99%) and negatively correlated to the positive image of Brazil in the first model, meaning that the odds of having a positive image of Brazil are 32% smaller when receiving a Brazilian funding – differently from the previous independent variables. Also, in model 1, being resident in Latin America is highly significant (99%) and positively correlated to a positive image, while being a woman is significant (95%) and negatively correlated.

In model 2, one more variable was added: being a humanities student in Brazil. The variable has high significance (99%) and is negatively correlated to the positive image. The odds of having a positive image of Brazil are 32% smaller when the area of study in humanities. Brazilian funding and gender (being a female) lose part of significance and strength but continue significant and negatively correlated. Being a Latin America resident sustains both a positive effect and a high significance.

TABLE 6
Educational and research programs and the perception about Brazil

	Model 1		Model 2		Model 3	
	β	OR	β	OR	β	OR
Brazilian funding	-0.384*** (0.075)	0.680	-0.286* (0.139)	0.750	-0.233 (0.235)	0.791
Latin America	0.531*** (0.081)	1.70	0.560*** (0.118)	1.75	0.325* (0.158)	1.38
Gender	-0.185** (0.073)	0.830	-0.160 (0.094)	0.851	-0.202 (0.131)	0.817
Humanities	-	-	-1.05*** (.105)	0.349	-1.18*** (0.155)	0.304
Duration	-	-	-	-	-0.0006* (0.0003)	0.999
Southeast	-	-	-	-	0.194 (0.128)	1.21
Age	-	-	-	-	0.006 (0.007)	1.00
Constant	-4.74*** (.073)	-	-2.250 (.167)	-	-0.419 (0.388)	-
Observations	3.333	-	2.126	-	1.155	-
LogLikelihood	-2229.63	-	-1347.49	-	-723.88	-
Likelihood ratio test	-	-	-	-	-	-
Pseudo R^2	0.01	-	0.05	-	0.05	-

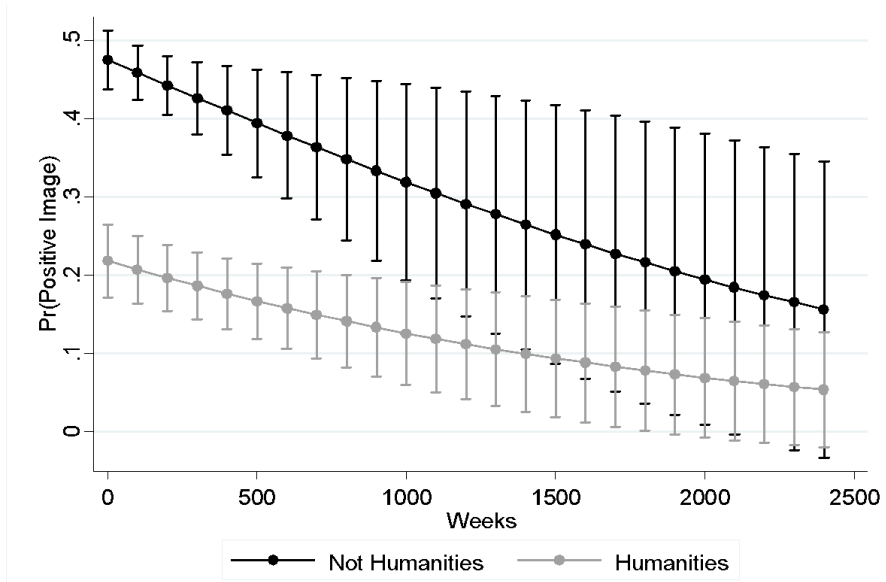
Authors' elaboration.

Obs.: *** 99%; ** 95%; * 90%.

The third model adds 3 more variables: duration, Southeast, and age. In this model, significance and strength decline for all variables. Latin America is significant (90%) and positively correlated, while humanities is highly significant and negatively correlated. According to this model, the odds of having a positive image of Brazil increases by 38% if the respondent lives in Latin America and decline by almost 70% if the respondent took any course in the humanities area.

The variable duration is also significant with a negative correlation effect. To visualize the effect of humanities over time, a *marginsplot* was created. Time course diminishes the difference of the humanities effect on the positive image. After 18 years, the area of study loses its effect on the image of Brazil.

FIGURE 2
The effect of studying humanities on a time course



Authors' elaboration.

Obs.: Figure whose layout and texts could not be formatted and proofread due to the technical characteristics of the original files (Publisher's note).

The construction of the independent variable is, obviously, crucial to its correlation to the perception of Brazil declines. When the perception of PECs participants is compared to a restricted universe (PECs2), that is, international students who were part of Brazilian programs other than the PECs, there is a significant positive correlation with the positive image of Brazil. However, the results are weaker when the perception of PECs participants is compared to the perception of all respondents (PECs1). In order to test another cluster against all respondents, the third independent variable created was the sum of all international students who participated in Brazilian programs. In this case, the correlation is inverted and becomes negative. This seems to point to the importance of the PECs specifically considered as an educational program and its special impact on international students.

8 BRAIN DRAIN, BRAIN GAIN, AND BRAIN CIRCULATION

According to the literature, brain drain is the movement of attraction – either deliberate or not – of qualified professionals from one country to another, increasing the capital stock of the latter; in this case, human capital. In this sense, researchers point to education's role in increasing a country's capacity for innovation and transmitting the knowledge necessary for new technologies to be assimilated and used (Aghion et al., 1998; Benhabib and Spiegel, 2005;

Nelson and Phelps, 1966). The literature also emphasizes the impact of human capital qualification on the different growth rates in countries/regions (Barro, 2001; Hanushek and Woessmann, 2012; Mankiw, Romer and Weil, 1990; Vandebussche, Aghion and Meghir, 2006).

As previously discussed, brain drain is considered a possible negative externality of education programs with soft power and cooperation objectives. The rationale behind these programs is to create long-lasting relationships between international students and Brazilian citizens and institutions to create a positive image of the country amongst international elites.

Thus, it is necessary to analyze whether the recipient of the scholarship returned to their country of origin and thus maintained the bond that would make it possible to exert the type of influence that, as we believe, is expected from a scholarship. This possible externality of policy needs to be detected if it is to be corrected or, even better, used by the donor country in another policy.

Consequently, if PEC students remain in Brazil, where they receive higher education training and create important professional connections, they will not return them to their country of origin, making returning to the home country an important aspect of the programs' goal.

Among the survey respondents, 418 are ex-students of PECs, 63% live in the same country of citizenship, 24% live in Brazil, and 13% live in a third country. In other words, 66% of those who live in a country other than their country of origin stay in Brazil. Nevertheless, if we were to consider the goal of approximating Brazil of international elites, 79% of the respondents live outside of the country, potentially contributing to the goal of ameliorating the countries image abroad.

As indicated and made evident by communications analyzed amongst the concerned Brazilian ministries, preventing the stay was an essential part of the programs' design as it could pervert its spirit (Ferreira and Oliveira, 2020). As already stated, it is crucial to shed light on these numbers to evaluate if the PECs are reaching their proposed objectives, and brain drain appears both in the literature and in Itamaraty's documents as an undesired externality program like PEC. However, it was never the goal of the program to gain brains.

As Bénassy and Brezis (2013) pointed out, even the literature on brain drain has started to recognize the complexities involved in the development externalities of scholarship programs. As the authors show with their quantitative analysis, the burden on developing countries should not be underestimated. However, the dual aspect of the phenomenon becomes to clarify itself. Migration return could eventually produce a brain gain in developing countries, besides the original loss at the first moment.

Even if studying abroad increases the chances of living abroad (Oosterbeek and Webbink, 2011), the literature progressively highlights the importance of brain circulation. It becomes clear how the goal of the programs, PEC-G and PEC-PG, can be indirectly achieved through relocation to a third country, even if it is to continue the recipients' education with a different degree. In this case, the only goals eventually disrupted are those attributed to the programs by a specific government as it would like to focus on strengthening relations with specific countries or regions (as was the case with the PT governments and its aim to improve Brazilian relations with the African continent). However, they would not impact the state's general goal of improving the country's image with international elites as a tool of soft power (Ferreira and Oliveira, 2020). In this sense, even if including third countries, brain circulation could be understood as a potential positive consequence.

9 CONCLUSION: WHAT IS NEXT?

Regarding the analysis proposed in this research, it is possible to affirm – according to interviews made and documents analyzed – that PEC-G and PEC-PG are scholarship programs with both cooperation and soft power objectives since their genesis. On the other hand, the survey showed that most respondents have a negative image of Brazil. The bias affects the sample since the country goes through an intricate political context. However, what matters to this research is not the image itself but the effect of the PECs on this image. Although it was impossible to achieve the criterion of randomness and a significant sample, compromising inference for the entire student population, we argue the correlation found is an important finding that should be expanded and detailed in future randomized quantitative studies and in-depth qualitative ones.

Many factors can contribute to one's perception of the country, which is one of the dimensions to be analyzed when using soft power/influence as a conceptual tool. Logistic regressions were used to compare the perception of PEC participants with that of other groups to find the correlation between the programs and the perception of Brazil. A correlation was found between being a PEC student and having a positive image of the country compared with international students of other programs and all other respondents.

Power in the contemporary world is complex. Its exercise involves the interplay of behaviors and resources available to each actor, depending on the evaluation of each situation through cost-benefit estimation. The literature explains patterns by creating concepts of power; one of them is *soft power*, herein defined as a modality of power that does not use coercion or co-option but rather attractiveness and persuasion.

This definition seems to fit perfectly the main activity of diplomacy, especially as regards *public diplomacy* – so developed nowadays thanks to the possibilities brought forth by technological development. There is also a more profound interplay between public diplomacy and technological development since the main engine to a country's development – in welfare, economy, and so on – is its knowledge and technology.

Cooperation programs are used as assets to create connections at different levels. This seems to be one of the reasons why the literature is increasingly paying attention to education, science, and technology as foreign policy/diplomatic tools. This literature is consistent with Brazilian diplomatic practices found in Itamaraty's documents and the interviews regarding PECs, an educational cooperation program.

The most significant novelty is that developed countries usually implement these programs, while Brazil has a challenging position in the transnational arena as a developing country. Even if it is not considered developed, Brazil's position as a "middle power" places it below the most developed countries. It is still an important player globally, especially influential in the region. Therefore, these Brazilian educational cooperation programs – PEC-G and PEC-PG – are consistent with the literature on soft power and public diplomacy, mainly because it works as a legal umbrella for bilateral agreements that can be modeled and analyzed as vectors: an amount with magnitude and direction.

This work has demonstrated that the policy currently presented in the PECs started in 1930 with the signature Brazil of bilateral agreements for cultural and educational cooperation. Given the massive number of international students in Brazil due to these agreements, the program was created to standardize procedures and effectively manage such cooperation.

In this perspective, during the last left-wing administrations, Brazil continued to invest in this foreign educational policy; it has also strengthened and inserted it into a broader government program aligned with the solidarity discourse and focused on Global South countries.

An important feature of this policy is the lack of institutional evaluation by the MRE. Although some academic work has been done on the subject, mainly because of the focus on South-South cooperation adopted by the last governments, there is no evaluation being carried out concomitantly with the policy itself to evaluate its desired complex outcomes and to assess the factors that contribute to either the success or failure of this educational policy. Through the interviews, it is also clear that the government lacks a strategic approach to the programs in economic and regional goals. The program is still to be combined with other soft and hard power forms, including financing of investment and infrastructure – a

field in which Brasil tried to consolidate itself through the funds made available by the National Bank for Economic and Social Development (Banco Nacional de Desenvolvimento Econômico e Social – BNDES).

A structured evaluation of the selection processes, for instance, could provide important information according to up-to-date methodological designs. In this sense, the government could greatly benefit from establishing partnerships with universities' research institutes. Such data would permit not only to improve the policy according to its complex goals but also to provide accountability tools to the actors involved and Brazilian citizens. Implementing a systematic evaluation process for both programs seems to be the next main challenge to policy-makers.

Moreover, accountability processes are now much more accessible than twenty years ago, thanks to improved data storage and transmission available to many citizens. In a world so profoundly transformed by technological development, legitimate policies that seek to build common ground, allowing values to be shared, are becoming increasingly important.

The survey presented in this work is a frame and sheds light on the part of the issues related to the PECs. The consistent repetition of the survey, creating a longitudinal analysis, would be a more practical design for deeper public policy analysis. Another design – that could be used in combination with the one just mentioned – is the application of a survey to all PEC candidates before their selection, and again after the results, reapplying the survey periodically to both groups to measure the difference between them over time. Those are indications for further analysis.

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