Schooling and living conditions in the city of Recife

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Abstract: The article investigates the relation between schooling and social conditions of existence in the city of Recife. To do so, the sociodemographic and educational data of the population were used, produced by the 2010 IBGE Census and by INEP. These data were treated with the help of a Standard Principal Component Analysis (PCA). Through this statistical method, it was possible to relate together educational indicators, sociodemographic characteristics of the population and urban equipment available in the places of residence. The results reveal the importance of the socioeconomic dimension, but also of the social characteristics of the place of residence and the variables of racial classification, in order to understand the educational disparities among the population in the city of Recife.

Keywords: educational inequalities, living conditions, social structure, Recife, Brazil

Introduction

The present article develops a reflection on the phenomenon of school longevity in contemporary societies, based on a study on the relationship between the educational level of the population in Recife and its social conditions of existence².

The work extends previous research on the academic trajectory of students who entered the Pedagogy course of the Federal University of Pernambuco between 2008 and 2012 (Ferreira & Lins, 2015), which found a very high family investment in the schooling of their children, a decisive factor in enabling them to enter public higher education and to

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^{2.} Located in northeastern Brazil, which is now one of the poorest regions of the country, Recife was one of the most important Brazilian cities throughout the colonial period (XVI-XIX), thanks to the sugar economy maintained by the work of African slaves and external market. Like other Brazilian metropolises, Recife is composed of extremely disparate territorial units. In the city, it is possible to find neighborhoods with a Human Development Index (HDI) that is higher than that of Norway (considered the highest in the world in 2000) and others with indexes equivalent to those of poor countries in Africa and Asia, such as São Tomé and Príncipe, Equatorial Guinea, Tajikistan and Mongolia (Bitouin, 2005, p. 26).

complete an undergraduate course. That fact that is considered important, once Pedagogy students are among those whose socioeconomic profile is marked by low volumes of both economic capital and cultural capital (Ferreira & Lins, 2015, p. 103).

The results of this first research led us to think that if, on the one hand, the processes of socialization in the family environment are fundamental for the construction of long school trajectories (Piotto, 2014; Almeida, 2014; Zago, Romanelli & Nogueira, 2011; Viana, 2007; Lacerda, 2006), on the other hand, the factors related to families' living conditions are no less important¹.

There are several studies that seek to understand the growth and intensity with which families from different social classes have invested in the extension of their studies (Peugny, 2014; Pochmann, 2011; Nogueira, 2006; Segnini, 2000; Baudelot, 2004). In addition to the increasing of school education in access to employment², the literature indicates that the increase in the population's years of study is strongly associated with the productive restructuring and the growth of structural unemployment, which occurred in the last thirty years. In the case of Brazil, it was about ensuring the modernization of the country's productive structure (and thereby ensuring greater competitiveness in the international market) through investment in school education for future workers. In this sense, increasingly longer studies have come to be seen as an essential contribution to economic development. According to Segnini (2000), the demands placed by the labor market would have prompted the emergence of educational public policies aimed at expanding the basic and higher education system as a way to qualify the workforce and thus also to improve the conditions of employability. Thus, the idea that the higher the level of schooling, the lower the chances of unemployment would be guiding the school investments of various social groups. Not only would the intermediate and higher classes be mobilizing with greater force the formal knowledge provided by the school to the extent that great economic crises are present in a lasting way. The fear of social disqualification and of experiencing situations of great precariousness would also affect the families of the popular classes, leading the latter to invest in prolonging their studies as a way to guarantee better conditions for a job (Pochmann, 2011)³.

^{1.} Even the UFPE adopting the system of social quotas for low-income students from public schools since 2002, we verified that of the 170 students of the Pedagogy Course, investigated in the previous research, at least 42% of them did their secondary and primary studies in private schools. Attention was also drawn to the fact that these students did not need to reconcile study and work throughout high school, a fundamental objective condition to comply with the requirements of the admission exam for access to public universities in Brazil (Ferreira & Lins, 2015).

^{2.} As school titles became decisive in defining occupational destinations and in competition for status (Collins, 1979), family projects were gradually transformed into schooling projects. Unlike in the past, when the occupations were transmitted directly from parents to their children, in the contemporary world, school became a privileged space for the acquisition and transmission of individuals' professional skills (Nogueira, 2016; Baudelot, 2004).

^{3.} In Brazil, it is possible to verify how much school resources constitute instruments to survive in the midst of deep economic crises. According to a survey conducted by the Inter-Union Department of Statistics and Socio-Economic Studies (DIEESE/2018), although the number of employees fell from 92.4 to 91.4 million between 2014 and 2017, due to the economic crisis, only those with a lower educational level were in fact in a precarious situation. This is because the number of employees with up to full elementary school decreased by close to 4.8 during the cited period. On the other hand, there was a numerical increase of almost 2.2 million people with complete higher education. In turn, the number of those with complete or incomplete high school education increased slightly

Although the economic conjuncture makes it important to think about the relationship that individuals generally establish with the school system, it is necessary not to lose sight of the different dimensions of social life that correlate with the schooling process. Seeking to reflect on the increase of the years of study as a result of a confluence of social factors, ranging from housing situation to access to health promotion policies and ownership of economic and cultural capital, we conducted a study on the territorial distribution of inequalities in Recife.

To do so, we have used a well-known bibliography about inequalities (Hasenbalg & Valle, 2003; Marques & Torres, 2005; Souza, 2006; Ribeiro, 2011) and the sociodemographic data of the 2010 Census, produced by the Brazilian Institute of Geography and Statistics (IBGE), as well as the educational indicators provided by the National Institute of Studies and Educational Research "Anísio Teixeira" (INEP)¹. We adopted, as a territorial analysis, the neighborhoods that make up the city of Recife². This procedure allowed a global view regarding the unequal distribution of different social and cultural resources between the groups, thus avoiding partial understandings about the social reality studied (Oberti & Preteceille, 2016).

The sociodemographic and educational data of our study were treated with the aid of the Standard Principal Component Analysis (PCA)³. The results reveal the importance of the socioeconomic dimension, but also of the social characteristics of the place of residence and the variables of racial classification, in order to understand the educational disparities in the municipality of Recife.

Teaching system and school market in Recife

Our study starts from a Brazilian reality marked by a significant increase in the number of enrollments at all levels of education. In the period 2000 to 2013, for example, enrollments in Early Childhood Education increased from 5,338,196 to 7,590,600, that is, in 14 years there was an increase of 42.2%. In high school there was an absolute growth of enrollment from 8,192,948 (2000) to 8,312,815 (2013). When it comes to professional technical education in high school, the number of enrollments more than doubled for the same time span (from 645.4 to 1,482.3). With regard to Higher Education (classroom

^{3.} By means of this statistical method it is possible to know the set of variables which are better correlated statistically and which determine the main axes that structure the space of educational inequalities in Recife. Presented as clouds of points in a multidimensional space, individuals (in our research the individuals are the neighborhoods) move away or approach depending on this structure of correlations. This method allows us not only to work with the set of variables that define the space (called active variables), but also with a set of variables, called supplementary variables, which, when projected in the already defined space (by the active variables), help to better understand the cleavages of this space (Lebaron, 2006, 2015).



with more than 1.5 million. For more information access the following website: https://www.dieese.org.br/anuario/2017/Livro0 AnaliseIndicadoresSelecionados.pdf. Accessed: April, 2018.

^{1.} We thank Jan Bitoun, Rejane Lyra and Maria das Graças Duarte de Paiva for the discussions and location of the data produced by IBGE for the municipality of Recife.

^{2.} Our database was constructed based on the information produced by IBGE by weighting areas (unit of analysis with the greatest disaggregation of educational information) and, in the case of Recife, correspond to the neighborhoods. For more information, consult the following websites: http://censo2010.ibge.gov.br/coleta/questionarios.html; http://ibge.gov.br/home/estatistica/populacao/censo2010/resultados gerais amostra areas ponderacao/default.shtm. Accessed: October 2016.

and distance), enrollments almost tripled over the 13-year period (2000 to 2012)¹. Parallel to the expansion of the education system, a set of affirmative policies (social and racial quotas in higher education) was implemented², allowing a greater participation of the social strata with low cultural and economic capital in the education system (Barbosa, 2014). Despite this broad expansion, access to school in Brazil is still very heterogeneous and unequal. As the literature points out (Melo, 2007; Hasenbalg & Valle, 2003; Ferreira, 2000), the entrance into the school system is strongly related to the purchasing power and the social capital of families, thus contributing to the reproduction of school and social inequalities. This becomes even more evident when we look at higher education enrollment and course choices made by students³. As Vargas points out (2012, 2009, 2008) the access of students from popular classes has not altered, in fact, the socioeconomic profile of undergraduate courses of greater social and professional prestige. The expansion at this level of education would be more tied to the reorganization of social inequalities within school than to the inclusion of students from the lower classes (Vargas, 2012).

In Recife, whose case is not very different from other metropolises, the expansion and entry into the education system also occurred in a diverse and distinct way. The growth in demand for qualification in the city dates back to the end of the nineteenth century, when the sugar mills were installed and the sugar economy rekindled the population flow towards Recife (Santa, Egito & Peres, 2000). With a significant population increase from 100,000 in 1897 to 200,000 in 1910, pressure for services intensified and commercial stores, manufactures, hotels, schools and hospitals were installed in the city⁴. In addition to the municipal primary schools, private Catholic schools, run by different religious congregations (Jesuits, Salesians, Marists and Carmelites), were located in the central region of the city, a place of commerce and housing for most of the affluent population⁵.

^{1.} For more information consult the report Education for All in Brazil (2000-2015) available at the Portal of the Ministry of Education: http://portal.mec.gov.br/docman/junho-2014-pdf/15774-ept-relatorio-06062014/file. Accessed: March 2019.

^{2.} Considered as one of the main tools for expanding educational opportunities in Brazil, the Quota Law (Law 12,711) reserves 50% of the available places in the universities and federal institutes to students who have completed high school by the public educational system, the ones who come from low-income families and the ones who self-declare blacks, mulattos or indigenous. UFPE (2002) is among the first federal universities to adopt the quota policy, in addition to the State University of Bahia (2002), the University of Brasília (2003) and the Federal University of São Carlos (2006). For more information, see Lima and Ramos (2017).

^{3.} See also the report produced by the National Association of Directors of Federal Institutions of Higher Education (ANDIFES), in 2015, in which it is possible to verify that low-income students still enter mainly in the less prestigious social and professional courses, as is the case of those destined to the education of teachers of the basic education (Licenciaturas and Pedagogia). Consult http://www.andifes.org.br/pesquisa-perfil-socioeconomico-dos-estudantes-das-universidades-federais/. Accessed: September 2018.

^{4.} In addition to sugar, as of 1850, cotton has also become an important export commodity. As a result, Recife had become a commercial city, serving as a regional port of the Northeast. Rail linking Recife to the countryside is installed, as well as a renovation of the Port. As a result, the movement of goods in the city increased significantly, making it take over the position of the country's third largest port, in 1909, in product movement (Santana, Egito & Peres, 2000).

^{5.} The first school created in the city, Ginásio Pernambucano, dates from 1825 and was dedicated to the formation of the children of the local administrative elite (those were not sent abroad). The installation of Catholic schools by the different religious congregations in the city was linked, as Miceli (2009) points out, to the prohibition of Catholic religious practices in Europe, due to the institutionalization of the republican school. This made several of these congregations migrate and

A significant part of the school-age population in the first decades of the twentieth century was out of school, as a 1915 Census points out: for a universe of 19,683 students, there were 300,000 school-age people (Santa, Egito & Peres, 2000). Urban reformulations carried out in the 1930s along with "sanitation" projects downtown that aimed at removing substandard housing, as well as the opening of large avenues in the city (1950), provoked a migratory flow towards the north and south areas of the city, making school supply follow a similar logic, without, however, guaranteeing more equitable access between social groups (Bitouin & Souza, 2015).

Presently, Recife's primary school supply is made of 1,578 educational establishments, of which 965 are offered by the private sector. Following the national trend¹, the expansion of the private network has been occurring more strongly in the initial grades of basic education; as evidenced by research conducted in other major cities of Brazil (Medeiros & Januário, 2014; Camelo, 2014). Thus, of the 748 schools dedicated to basic education, more than half, 57% of them, are private. Preschool education is also offered in almost 70% of private schools and 49% of high schools are private (99 out of 203)².

The value of the tuition fees of these private schools, which ranges from one fourth to three minimum wages, also points to a very diverse expansion of the school market³. If we take into account that part of the insertion in the labor market and, particularly, the access to the best paid positions depends directly on the educational investment made very early, these data show how much the organization of the basic education system is segmented. This segmentation can also be evidenced in higher education, since, as demonstrated by Janete Azevedo's study (2015), only 2% of the young people between 15 and 24 years old living in the poorest neighborhoods of Recife (considered highly vulnerable) had access to university studies in the last decade.

Despite the absence of data that allow analyzing the social morphology of students attending higher education establishments in the city, the findings by Arruda's study (2011) carried out at the Federal University of Pernambuco (UFPE) are somehow relevant. As the author shows, the number of students from public schools with a monthly income of 1 to 2 minimum wages increased by 16.8% between 2006 and 2010, when the number of positions increased and the number of courses increased at UFPE⁴. However, this does not prevent, as the author points out, that the most socially valuable courses are still mostly reserved for students from private schools. Unlike students from public schools who tend to opt for courses in Philosophy and Human Sciences, the presence of students from the private school is significantly higher in the courses of Administration, Law, Medicine, Engineering, Dentistry and Accounting Sciences.

invest in education, creating schools and boarding schools, as a way to guarantee their political and patrimonial survival.

^{1.} According to data from the MEC/INEP school censuses from 2003 to 2013, enrollments in private elementary schools in the country increased from 12% to 17%.

Consult IBGE, Search on profiles of Brazilian cities: https://cidades.ibge.gov.br/brasil/pe/pesquisa/13/5902. Accessed: October, 2018.

^{3.} Currently, a minimum wage in Brazil, R\$998.00, is equivalent to US\$249.86 per month.

^{4.} This expansion process, along with the creation of new courses and the opening of night shifts at federal public universities, was due to the implementation of the Federal University Restructuring and Expansion Program Support Program (REUNI) by the Ministry of Education. The said program aimed to guarantee the access and permanence of students of less privileged origin in public higher education.

Recife: a city of strong social contrasts

With a population of slightly more than 1.6 million people, Recife recorded a nominal GDP of 30 billion in 2010, considered one of the largest among the state capitals of the North-Northeast region¹. Its Human Development Index (HDI) has increased in the last decades, from 0.58 in 1991 to 0.72 in 2010². Although the education dimension has been the one that grown the most in absolute terms in the last three decades, with growth of 0.129 between 1991 and 2000, and 0.160 between 2000 and 2010, contributing to the overall increase of the HDI of the city, its distribution is still one of the more unequal. Thus, the average rate of the population with a higher education diploma is only 16%. However, we have regions where only 1% of the population has that resource. The same can be observed for the longevity of the population, which along with education has become one of the dimensions that have most evolved positively. However, only in some regions of the city the population is over 70 years old.

Even though it is an important indicator for the economic development of the Northeast, the GINI index, which allows us to describe income inequality, has practically not changed in the last decades: 0.67 in 1991, 0.67 in 2000 and 0.68 in 2010, being considered the worst value among the Brazilian state capitals³. Thus, despite the economic investments that have occurred since the end of the 1980s, and, more recently, policies of real appreciation of the minimum wage and direct income transfer⁴, the income concentration continues to be a striking feature of the city. About 30% of the population has a monthly nominal income of up to 1 minimum wage, and in certain regions in the city, 43% of the population survives with this amount. Only 2% of the population lives with a monthly income over 20 minimum wages. If we look at the monthly household income we find similar disparities. Only 1% of households have a monthly income over 5 minimum wages.

With regard to the employment of the population, attention is drawn to the informality that affects about 24% of the employed population in the city. There are still regions where this is the working condition of 34% of the population.

The distribution of data concerning the household conditions is also revealing of the structural asymmetries present in the city of Recife. This is because on average 31% of households do not have a public sewage system. In some regions of the city, this is the reality for almost 81% of households.

Thus, even if it is possible to identify within the same territorial unit (region) the coexistence of groups that are hierarchically differentiated from one another, as pointed out by studies dedicated to understanding the social life of certain neighborhoods or urban agglomerations (Oliveira, 2013; Ernica & Batista, 2011), the analysis of the first results

^{1.} Among the capitals of the North and Northeast, Recife occupied the third position in 2010, while Salvador and Fortaleza occupied the first and second, respectively. See IBGE, Report on the participation of capitals in the Brazilian GDP. Consult: https://censo2010.ibge.gov.br/noticias-censo.html? busca= 1&id=1&idnoticia=3070&t=2010-2013-participacao- capitais-pib-pais-recuou-34-3-32-8&view=noticia. Accessed: December, 2018.

^{2.} See Human Development Atlas (2013): http://atlasbrasil.org.br/2013/. Accessed: December, 2018.

^{3.} See Program of the United Nations in the Atlas of Human Development (2013): http://www.pnud.org.br/Tags.aspx?tag=AtlasBrasil2013. Acessed: October, 2018.

^{4.} This policy had a significant impact on the poorest regions in the Northeast, especially the Metropolitan Region of Recife, where in 2010 about ¾ of the employed population had incomes of up to 1 minimum wage in the main job. See Bitoun and Souza (2015).

helps us to realize how inequalities between the regions of the city are enormous. By providing a more in-depth knowledge of all the variables we had to deal with the theme of our research, this global view of the distribution of different social and educational resources of the population was fundamental to determine the set of variables (active and supplementary) to be used in the multidimensional analysis about the educational disparities of the population in the city of Recife¹.

Methodology

The choice of the variables to construct the space of educational disparities in the municipality of Recife was firstly linked to the concern not to address such disparities from a predominantly economic perspective and, secondly, to the availability of information on the platforms of IBGE and INEP².

Hereupon, among the 15 variables chosen as active (Table 1), we have data on the level of household income in minimum wages and enrollment, data on public infrastructure, as well as indicators related to health and educational and social vulnerability, expressed by the percentage of the population over 70 years old (longevity), the percentage of students with a lag in relation to the ideal age for the elementary school grades and the death rate of the population between 15 and 24 years old, respectively³.

Variables	Definitions and sources		
Population over 70 years	Percentage of the population over 70 years old.		
old	Basic source: IBGE/Demographic Census 2010.		
Population rate between	Percentage of the population between 5 and 9 years old that is		
5 and 9 years old that is	literate. Basic source: IBGE/Demographic Census 2010.		
literate			
Distortion rate age/grade	grade Percentage of students who have two years or more as a gap in		
Elementary I	relation to the appropriate age for the grades of elementary school I in		
	public and private schools.		
1	Basic source: School Census MEC/Inep, 2011.		

Table 1. Active Variables

^{1.} After the simple study on the central tendency, dispersion and distribution of each variable, the choice of the active and supplementary variables for the development of our multidimensional analysis was made. The choice of the active variables obeys first of all a criterion of representativeness: it is a question of apprehending the essential aspects of the phenomenon that we want to study. Thus we adopted as active variables those that could synthesize in a simple way the living conditions and the educational characteristics of the population. The additional variables, which are projected on the active variables, had the function of refining our analysis.

^{2.} In addition to INEP and IBGE, we also consulted the websites of the City Hall of Recife and the Observatory of the Metropolises for data on public facilities available in the city.

^{3.} We adopted the variable "percentage of students with two years or more of lag in relation to the ideal age for the grades of elementary education I in public and private networks" to the detriment of the variable "percentage of people aged 25 or over without education and incomplete elementary education" to obtain a better dispersion of the other variables. After some tests, we verified that the variable "percentage of people aged 25 or over without education and incomplete elementary education" when correlating strongly with the "percentage of pupils in age – grade distortion in Elementary I" would obscure other dimensions related to educational disparities.

Complete High School	Percentage of people aged 25 years or over with complete high			
	school or incomplete higher education.			
	Basic source: IBGE/Demographic Census 2010.			
Complete Higher	Percentage of people aged 25 years or over with complete higher			
Education	education.			
	Basic source: IBGE/Demographic Census 2010.			
Income of up to a quarter	Households by Income Range, in minimum wages.			
of Minimum Wage ¹	Basic source: IBGE/Demographic Census 2010.			
Income between 1-2 MW	Households by Income Range, in minimum wages.			
	Basic source: IBGE/Demographic Census 2010.			
Income greater than 5	Households by Income Range, in minimum wages.			
MW	Basic source: IBGE/Demographic Census 2010.			
Employment Without a	Population working without a formal contract.			
Formal Contract	Basic source: IBGE/Demographic Census 2010.			
Public beds	Total beds in public hospitals. Basic source: Health Secretariat of			
	the State of Pernambuco, http://portal.saude.pe.gov.br/hospitais.			
Occupation of managers	Population that is 10 years old or over, by large occupation group			
and directors	in the main job. Basic source: IBGE/Demographic Census 2010			
Households without	Total households without sewage system.			
sewage system	Basic source: IBGE/Demographic Census 2010.			
Deaths of young people	Rate Deaths of young people between 15 and 24 years old.			
between 15 and 24 years	Basic source: IBGE/Demographic Census 2010.			
old				
Public Infrastructure	Index of public infrastructure (lighting, sidewalks, pavement,			
Indicator from IBEU	access for wheelchair users on sidewalks around households).			
	Basic source: Observatory of the Metropolises,			
	http://www.observatoriodasmetropoles.net.			
City Gym	City Gym Availability. Basic source: Website of the City Hall of			
	Recife, in Open Data of Recife, http://dados.recife.pe.gov.br/.			

As *supplementary* variables we have adopted: self-declared race/color; marital status; place of birth and the type of permanent disability². We have also included educational indicators such as school attendance rate by course, and attendance rate by type of school system. The insertion of these two variables was associated with the attempt to create indicators that could help us to think over the relationship between school investments and objective conditions.

^{2.} The decision to label this set of variables as supplementary, in particular the variables of racial classification, was linked to the need to ensure a better dispersion of data related to the educational dimension. Data on the type of population disability have been transformed into supplementary variables in order to ascertain to what extent disabled people experience worse socioeconomic and educational outcomes than non-disabled people. The information on the marital status of the population and the naturalness of the resident was treated in order to refine the relationship between socioeconomic and schooling characteristics.



^{1.} In 2010, the minimum wage in Brazil was R\$510.00. Between 2000 and 2010, the minimum wage in Brazil increased from R\$151.00 (2000) to R\$510.00 (2010).

Variables	Definitions and sources	
Color/Race	Resident population rate, by self-declared color/race. Basic source:	
	IBGE/Demographic Census 2010.	
Marital Status	Rate of resident population, by marital status. Basic source: IBGE/	
	Demographic Census 2010.	
Place of Birth	Rate of the resident population, by place of birth in relation to the	
	municipality. Basic source: IBGE/Demographic Census 2010.	
Type Permanent	Resident population rate, by type of permanent impairment (hearing,	
Impairment	visual, motor and mental/intellectual). Basic source: IBGE/	
	Demographic Census 2010.	
Attendance at school	Rate of attendance of the resident population to the school, by type of	
	course. Basic source: IBGE/Demographic Census 2010.	
Type of educational	Rate of attendance of the resident population to school, by type of	
establishment	educational system Basic source · IRGE/Demographic Census 2010	

Table 2. Supplementary Variables

Presentation and analysis of results

The results of the descriptive methods such as the PCA one used in this study are flat graphs defined by factorial axes that can be interpreted from the numerical values of the variables that contributed to its construction. As previously mentioned, because of the similarity between the variables, this method enables to aggregate the urban configurations (referred to by the acronym Ar) with similar social resources or with a high degree of correlation between them. In addition to the numerical values attributed to the factors that define the axes, the interpretation of the PCA also requires a study of the clouds of points, formed by the 33 sets of neighborhoods, which in turn are structured according to the main axes defined by the set of active variables (Axis 1 and Axis 2)¹.

The result of the analysis of the active variables (Figure 1) shows the factors that contributed most to the definition of the axes and, therefore, of the different urban configurations. We begin with the interpretation of Axis 1, considering that the first one corresponds to 50.68% of the variance and then of Axis 2, with 15.18% of the variance (Figure 1). Axis 1 can be said to be the axis of human development in which the longevity, income, and level of schooling of the population appear strongly correlated. The population over 70 years old (+0.93) is the variable that is most positively correlated to Axis 1. After, households with a monthly income over 5 minimum wages (+0.92), the population whose main job is manager and/or director (+0.89), and, finally, the population with complete higher education (+0.85) and literate between 5 and 9 years old (+0.68) and the presence of public beds (+0.52). On the left side of Figure 1, we find the households with a monthly income of up to \(^{1}\)4 of a minimum wage (-0.94), followed by the employed population without a formal contract (-0.82). We also have negatively correlated to Axis 1 the majority of households without a sewage system (-0.71), the death rates of people aged between 14 and 25 (-0.57) and the percentage of students with two years or more of a gap regarding the appropriate age for the grades of Elementary School I in public

^{1.} The program used in this study was SPAD, version 8. We thank Frédéric Lebaron and the COHERIS Society for having made available a license of the program to carry out our work.

and private systems (-0.53). In this way, we observe that although the human development index (HDI) has increased overall for the municipality (from 0.66 in 2000 to 0.770 in 2010), we can see that this development is accompanied by precarious employment and/or underemployment.

In general, the results pointed out by the analysis of Axis 1 do not differ from the majority of studies on educational disparities, as highlighting the positive relationship between better socioeconomic conditions and higher levels of schooling (Hasenbalg & Valle, 2003; Ferreira, 2000). The regions of the city with the highest presence of households with an average monthly income above 5 minimum wages (Graças, Aflitos, Espinheiro, Tamarineira, Jaqueira, Boa Viagem) are the ones where we found the population with the highest level of schooling (complete higher education) and that has been literate between 5 and 9 years old, therefore in the age group considered appropriate to learn the alphabet. The population with the lowest level of schooling (Elementary) is, in fact, located in neighborhoods whose households have a monthly income of up to ½ of the minimum wage.

In addition to the correlation with the level of monthly household income, the territorial distribution of the schooling level of the population of Recife also appears strongly associated with longevity and the index of investment in public infrastructure. While the regions whose population has a higher education diploma are those with better living conditions (household income above 5 MW, a high public infrastructure index and a population over 70 years old), neighborhoods with lower infrastructure (without basic sanitation) and with high mortality rates among young people aged 15 to 24 years old (Brejo de Beberibe, Brejo da Guaribara, Passarinho, Guabiraba and Pau-Ferro) are those where we find the percentage of students who attend elementary school I with two or more years of lag in relation to the grade they are studying.

These results also report to the different studies that investigate both the effect of the place of residence on the construction of school trajectories¹ and the impact of the educational bonus on the chances of surviving after the age of 70, for example. As evidenced by the sociological and epidemiological literature, the cumulative impacts between financial condition and schooling affect people's health status in a non-negligible way: either because they enable conditions to acquire more information about healthy behaviors, or because of the differential access to health services (Alves, 2016; Santos, 2011; Hasenbalg, 2003).

Active variables	Axis 1	Axis 2
Population with secondary school	0.33	-0.74
Population with complete higher education	0.85	-0.17
Population over 70 years old	0.93	-0.14
Occupation of director and/or manager	0.89	-0.07

Table 3. Correlations between the active variables and the factors

Adopting diverse analytical perspectives, several Brazilian researchers have been interested in understanding how sociospatial inequalities, mainly related to the place of residence of individuals, function as a strong mechanism in the reproduction of social and educational inequalities. To do so, consult: Paula & Nogueira, 2018; Perosa, Lebaron & Leite 2015; Ernica & Batista, 2011; Koslinski & Alves, 2012; Ribeiro & Koslinski, 2010; Zuccarelli & Cid, 2010.

Emplyed population without a formal contract	-0.82	0.04
Age-grade dysfunction	-0.53	0.05
Urban infrastructure index	0.74	-0.34
Monthly household income up to 1/4 MW	-0.94	0.13
Monthly household income from 1 to 2 MW	0.16	-0.93
Monthly household income over 5 MW	0.92	-0.11
Households without sewage system	-0.71	0.17
Population between 5 and 9 years old who is literate	0.68	-0.32
Hospital beds	0.52	-0.19
City's public gym	0.07	-0.64
Deaths of young people between 15 and 24 years old	-0.57	0.14

Source: generated by the author.

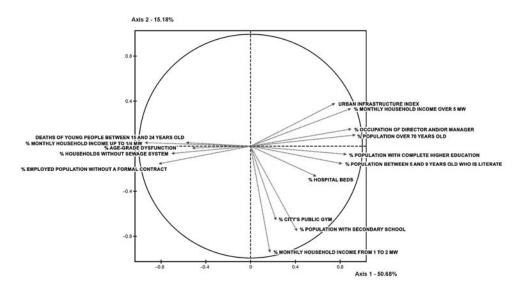


Figure 1. Circle of correlations of the active variables

Source: generated by the author.



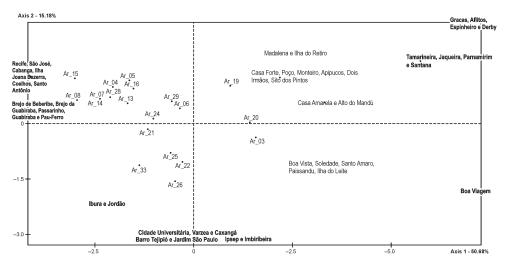


Figure 2. Clouds of neighborhoods and social space of Recife

Legend:

- Ar_03: Neighborhoods Campo Grande, Torreão, Encruzilhada, Rosarinho, Ponto de Parada, Hipódromo;
- Ar 04: Neighborhoods Campina do Barreto, Peixinhos, Arruda;
- Ar_05: Neighborhood Água Fria;
- Ar 06: Neighborhoods Fundão, Cajueiro, Beberibe, Porto da Madeira;
- Ar 07: Neighborhoods Bomba do Hemetério, Alto Santa Teresinha, Linha do Tiro;
- Ar 08: Neighborhood Dois Unidos;
- Ar 13: Neighborhoods Alto José Bonifácio, Morro da Conceição, Alto José do Pinho, Mangabeira;
- Ar_14: Neighborhood Vasco da Gama;
- Ar_15: Neighborhood Nova Descoberta;
- Ar_16: Neighborhoods Macaxeira e Córrego do Jenipapo;
- Ar 19: Neighborhoods Torre, Zumbi, Prado;
- Ar 20: Neighborhood Cordeiro;
- Ar 21: Neighborhoods Torrões and Engenho do Meio;
- Ar 22: Neighborhood Iputinga;
- Ar 24: Neighborhood Afogados;
- Ar 25: Neighborhoods San Martin, Bongi, Mustardinha and Mangueira;
- Ar 26: Neighborhoods Estância, Jiquiá, Caçote and Areias;
- Ar 28: Neighborhoods Coqueiral, Totó, Sancho and Curado;
- Ar 29: Neighborhoods Pina and Brasília Teimosa;
- Ar 33: Neighborhood Cohab.

Source: author's elaboration.

While Axis 1 brings forward the classical opposition between rich and poor neighborhoods, Axis 2 allows us to apprehend part of the social reality in a less polarized way. Households having incomes between 1 and 2 minimum wages (-0,93) and the population having completed high school (-0,74) are the most correlated variables in this second axis, followed by the availability of City Public Gym (-0,64). As we can observe in the Figure 1, the Axis 2 is a specific one for the neighborhoods that compose the Areas 27, 23 and 31. The corresponding neighborhoods are Barro, Tejipió and Jardim São Paulo (Area 27), folllowed by Várzea, Cidade Universitária and Caxangá (Area 23) and Ipsep and Imbiribeira (Area 31). The neighborhoods of the Area 27 are geographically situated in the southwestern sector of the city, while those of the Area 23 are in the extreme West and those of the

Area 31 are inside the Southern sector, i.e., they are not located at the seashore, a sector highly well deemed because it concentrates higher social strata.

The specificity of these neighborhoods lays in their intermediary position, compared to the others. At the same time, they combine monthly household incomes 3 to 6 times higher than the neighborhoods with the worst living standards (incomes corresponding to ½ of the minimum wage and houses without sewage system, for example), a high school degree and investments in public structure linked to the promotion of health (City Public Gym)¹. The incidence of secondary school degree correlated to a monthly income equal or higher than the minimum wage, as well as a living in neighborhoods with better public urban infrastructures allows us to see it as a resource of social protection to deal with situations of extreme vulnerability. In spite of the fact that we do not have any data of the last decades about social and professional conditions of the population, so that we could know what reconfiguration had happened in Recife's occupational structure and its relation with the urban space, we can assert that the neighborhoods on the Axis 2 show a heterogeneity in terms of use of the education system and its effects on the socioeconomic position of the individuals (Marques, 2014).

Even if economic rationale is closely related to housing conditions (the greater the financial conditions, the better the location of the property, comfort and so on), which is quite notorious in Recife², the intensity and the specific spatial forms of each city reflect specific ways through which the population try to accumulate cultural resources that are themselves linked to a larger set of social characteristics of the population.

Those specificities can be better understood through the analysis of the Figure 3, about the correlations between the supplementary variables.

The more positively correlated variables, in the Axis 1 of the Figure 3, are, by order, the self-declared white population (+0.98), the one that attends a postgraduate degree (+0.95) and the one that attends the private school system (+0.93). In opposition, negatively correlated to Axis 1, we have a self-declared population as black (0.97) and brown-skinned (0.81), followed by the population that is part of the elementary school system (-0.92) or attends whatever modality of the Education for Young and Adult People (EJA) (-0.63) and the unmarried population $(-0.83)^3$.

Therefore, those correlations allow us to reassert the weight of the socioeconomic dimension on the spatial distribution of educational disparities, since the populations that invest more in education, do postgraduate courses and study in the private schools system live in the regions with the best material conditions (household income and public infrastructure). The present public-private dichotomy in the Brazilian educational system explains the differences in the individual school paths, as we can see in our results and other researches (Las Casas & Cunha, 2018; Vargas, 2017; Almeida & Nogueira, 2002). On the other hand, the racial content, sometimes attenuated according to other social characteristics, is fundamental to understand the population educational inequalities in the city of Recife. This is because, as we can observe in the Figure 3, the self-declared black population is also the same showing the lowest levels of schooling and the most difficult school paths (measured respectively by the attendance in the Elementary School and in the Education for Young and Adult People – EJA).

^{1.} The City Public Gyms (space reserved for sports and nutritional orientation) are part of the public policies to promote health in the city of Recife. For more information see Leme (2013).

^{2.} On the one hand, extremely poor neighborhoods, and on the other, very rich neighborhoods.

^{3.} EJA is a modality of education for Young and Adult People who did not continue their studies and the ones who did not attend Elementary and Secondary School during the appropriate age.

Supplementary variables	Axis 1	Axis 2
Self-declared black population	-0.97	0.09
Self-declared white population	0.98	0.04
Self-declared brown-skinned population	-0.81	-0.21
Population with mental/intellectual disability	0.08	0.25
Population with significant visual impairment	-0.42	0.37
Population with significant motor impairment	0.07	0.02
Population with significant hearing impairment	+0.41	-0.16
Population without motor difficulties	0.46	-0.09
Married	0.63	-0.35
Divorced	0.64	-0.31
Widowers	0.36	0.22
Single	-0.83	-0.34
Attending masters' degree	0.95	-0.17
Attending elementary school	-0.89	0.19
Attending secondary school	-0.39	0.05
Private school	0.93	-0.26
Population born in Recife	0.79	-0.22
Literacy among young and adult people	-0.63	0.21

Table 4. Correlations between supplementary variables and the factors

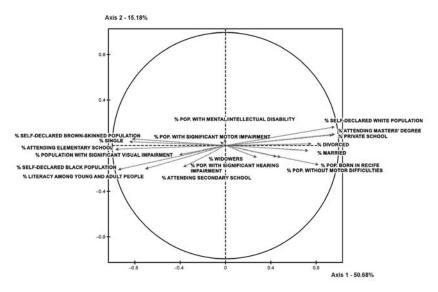


Figure 3. Circle of correlations of supplementary varieties¹

Source: generated by the author.

If we think that the extension of the school education levels is more than ever present in the economic activity and that it constitutes a central vector for life opportunities, the

^{1.} The Axis 2 does not present any correlation with the supplementary variables.

reduced presence of the population that declares itself black in the highest levels of the educational system and its over-representation in EJA shows that the racial separation is the heart of the process of accumulation of school, economic and social capital (Lima & Ramos, 2017; Vargas, 2015; Teixeira, 2015; Hasenbalg & Valle, 2003). It constitutes a worrisome perspective, since 59% of the population in school age is self-declared black or brown-skinned.

It is also pertinent to observe the highly significant correlation between marital status and the social and educational characteristics of the population. While the self-declared married or divorced population belongs to the highest social, economically and culturally endowed strata (high household income and a high level of education) and lives in the best regions benefiting from public infrastructure, the majority of the single population lives in low income neighborhoods and does not have any higher education degree. The marital status, amongst racial and socioeconomic characteristics, is a relevant factor in understanding school trajectories and the positions that the population occupies in the social and urban space in the city.

Final considerations

The results of this research point to the importance of socioeconomic factors, as well as the social characteristics of the territory, in the spatial distribution of the educational level of the population in the city of Recife.

It is in the neighborhoods having the highest level of education, where the population had access to private schools that we find the highest incomes, over 5 minimum wages and the best public infrastructure condition (paved streets, houses having sewage system, garbage removal, lightening, public spaces for sport practices and so on). In contrast to those neighborhoods, there are populations undergoing the worst living conditions (houses without sewage system and high mortality in the 14-25 years range rate), having the lowest scholar levels (measured by the high elevated rate of distortion age/grade in Elementary School I and by the frequency at the public school or institutions, like the Education for Young and Adult People – EJA).

The low level of literacy can also be related to the labor insecurity (lack of a formal contract). In spite of the lack of systematized information about the scholar availability and offer in the investigated territorial unities, which would help us to shed light on the social, spatial and scholar discrepancies (Paula & Nogueira, 2018; Ernica & Batista, 2011), it is always important to observe the contribution of the variables related to the living conditions to analyze the level of literacy of individuals.

Nevertheless, it is worth noting that, in the intermediary neighborhoods, a secondary school degree is highly correlated with 1 to 2 minimum wages and the access to public infrastructure (City Public Gym). From a global point of view, moreover from the upper classes' point of view, the social position occupied by that part of the population seems still vulnerable. But having a secondary school degree allows a social stability that in turn creates preliminary conditions for a relative living standard general improvement (Bourdieu, 2003).

To the social and economic dimension, including the living standards, needs to be added the racial issue, that invites us to a more accurate reflection on the universalization of elementary school and on the expansion of university education, especially for black and brown-skinned population. In the same path, we should pay attention to educational

advantages and disadvantages related to racial contents. We have seen an expansion of public education at every level during the last decades. Nevertheless, our study shows that the higher levels of education remain strongly associated to the white population, that have social and cultural resources required to achieve better social and professional positions in the world, which confirms other studies showing the effects of race/color on the distribution of educational inequalities (Teixeira & Vargas, 2015; Hasenbalg & Valle, 2003; Soares & Alves, 2003).

Finally, the use of the ACP technique, by allowing to visualize in a synthetic and multidimensional way the space of educational disparities in Recife, suggests that the possibility of people increasing educational levels remains strongly linked to their objective living conditions, defined by the overlapping of socioeconomic, territorial and racial dimensions.

Résumé: L'article examine la relation entre scolarisation et conditions sociales d'existence dans la ville de Recife. Pour cela, on a utilisé les données sociodémographiques et éducationnelles de cette population, produites par le recensement de 2010 effectué par l'Institut Brésilien de Géographie et de Statistique (IBGE) et l'Institut National d'Etudes et de Recherches sur l'Education (INEP). Ces données ont été analysées avec l'aide du programme Standard Principal Component Analysis (PCA). Par cetteméthodestatistique a étépossible la mise en relation des indicateurs relevant de l'é ducationaveclescaractéristiquessociodémographiques de la population et l'équipemenurbaindisponible dans leslieux de résidence. Lesrésultatsrévèlentl'importance de la dimensionsocioéconomique, maisaussi des caractéristiquessociales des lieux de résidence et des variables de la classificationraciale, afin de pouvoircomprendrelesdisparitéspropres à la population de la ville de Recife.

Mots-clé: inégalités dans l'éducation, conditions de vie, structure sociale, Recife, Brésil

Rezumat: Articolul examinează relația dintre școlarizare și condițiile sociale de existență din orașul Recife. Pentru asta au fost utilizate datele sociodemografice și educaționale privind populația produse în cadrul recensământului din 2010 de către Institutul Brazilian de Geografie și Statistică (IBGE) și de Institutul Național de Studii și Cercetări în Educație (INEP). Aceste date au fost analizate cu ajutorul programului Standard Principal Component Analysis (PCA). Prinaceastă metodă statistică a fost posibilă relaționarea indicatorilor educaționali cu caracteristicile sociodemografice ale populației și cu echipamentul urban disponibil în zonele de rezidență. Rezultatele revelează importanța dimensiunii socioeconomice, dar și a caracteristicilor sociale ale zonelor de rezidență și a variabilelor clasificării rasiale, pentru a putea înțelege disparitățile din rândurile populației orasului Recife.

Cuvinte-cheie: inegalități în educație, condiții de viață, structură socială, Recife, Brazilia

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