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SARA PARENTE FERREIRA SOARES

SKIN COLOR AND THE RISK OF DOMESTIC VIOLENCE IN BRAZIL

FORTALEZA

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Prof. Dr. José Raimundo de Araújo Carvalho Junior

Dr. Victor Hugo de Oliveira Silva

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BANCA EXAMINADORA

Prof. Dr. José Raimundo de Araújo Carvalho
Junior(Orientador)
Universidade Federal do Ceará

Dr. Victor Hugo de Oliveira Silva(Coorientador)
Instituto de Pesquisa e Estratégia Econômica do
Ceará

Prof. Dr. Diego de Maria André
Universidade Federal do Rio Grande do Norte

À memória de Louisiana Parente.
Eu vou te amar para sempre.

AGRADECIMENTOS

RESUMO

Esse estudo investigou o possível efeito da cor da pele e outras variáveis socioeconômicas na violência doméstica no Brasil. Com o objetivo de realizá-lo, regressões logit foram estimadas usando uma base de dados da PCSVDF^{Mulher}. Os resultados revelaram que possuir um trabalho não é significante. A idade (até certo ponto), grau de envolvimento com um parceiro e o fato de possuir uma criança tendem a aumentar a probabilidade de sofrer violência física, enquanto possuir maior grau de educação, não beber e não fumar tendem a decrescer essa probabilidade. Analisando os efeitos do colorismo, os resultados trazem à tona que possuir um tom de pele escuro tendem a amplificar a probabilidade de sofrer violência física de um parceiro íntimo. O que, infelizmente, demonstra outra forma de como a discriminação racial afeta as pessoas.

Keywords: Violência Entre Parceiros Íntimos. Violência doméstica. Colorismo. PCSVDF^{Mulher}.

ABSTRACT

This study investigated the possible effect of skin color and other socioeconomic variables in domestic violence in Brazil. In order to realize it, logit regressions were estimated using a database from PCSVDF^{Mulher}. The results revealed that having a job is not significant. The age (until certain point), degree of envolvement with a partner and the fact of having a child tends to increase the probability to suffer physical violence, while more degree of education, do not drink and do not smoke tends to decrease this probability. Analysing the effects os colorism, the results brings to light that having a dark skin tone tends to amplify the probability to suffer physical violence from an intimate partner, which sadly points out another form that racial discrimination affects people.

Palavras-chave: Intimate partner Violence. Domestic Violence. Colorism. PCSVDF^{Mulher}.

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1 Introduction

Accordingly to the WHO (World Health Organization), in Brazil, 4.8 to each 100,000 women are victims of feminicide, which ranks the country as the fifth the world in that crime. Not only that, Waiselfisz (2015) shows that black women are its major victims.

Violence Against Women generates negative costs to economy (BUVINIC; MORRISON; SHIFTER, 1999), to women's health and to their personal relationships (RENZETTI, 2009). And even if domestic violence affects poor women more then the rich (MAXWELL; STONE, 2010), it happens in every sphere of society. Adding to that, studies about colorism reveal that having a darker skin stone affects negatively the earnings at work (HERSCH, 2010), relationships and even the perception of society about their degree of attractiveness (HERSCH, 2011).

Therefore, this study focus on studying skin color and its relation to the risk of domestic violence in Brazil, an under-researched, but social important topic.

All data of this study come from PCSVDF^{Mulher} (Survey of Socioeconomic Conditions and Domestic and Family Violence against Women), a scientific project that has built up a longitudinal data set (more than 10,000 women) with detailed information on Gender Based Violence, along with socio-demographic and economic characteristics of the respondents. This research measured skin tone of interviewed women using two different scales: NIS skin color scale [1] and the classificatory system of "color or race" from IBGE[2].

Thanks to the variety of the information of the survey, other socioeconomic variables were also used in order to analyse their effects on Intimate Partner Violence (IPV), such as age, degree of education, civil status, employment, degree of addiction to cigarettes, degree of addiction to alcohol and if the woman has had at least one child. However, even though the survey brings further information of other types of violence (such as emotional and sexual), only physical violence is analysed with the objective to keep the focus on color classifications. [3]

Five models were estimated in order to perform this analysis. Data came from all Brazil's northeastern states capitals in 2017. [4]

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[1]A skin color scale that varies between 0 and 11. It is done by hetero attribution and it was tested in many scientific papers.

[2]A scale of color or race from Brazil that has five classifications: white, black, pardo, indigenous and Asian.

[3]Nevertheless, a study about the effects of socioeconomic variables on those three types of violence using data from PCSVDF^{Mulher} is a personal aim.

[4]In 2019, PCSVDF^{Mulher} had results from two waves of the questionnaire, wave 1 regarding 2016 and

Five models were estimated using logistic regression [5], since the dependent variable, physical violence, is binary.

The results exposed that age (until certain point), degree of attachment with a parner and being a mother tends to increase the probability of the women to suffer physical violence. While more educational degree, do not drink and do not smoke tend to decrease this probability.

The findings also showed that the probability to suffer physical violence from an intimate partner raises as skin color gets darker. In addition to that, skin color tends to not affect the probability of suffering physical violence if women selfclassificated them as whites or pardas, but it affects them when they are blacks.

This paper is divided in six sections, including this one, which is a brief introduction of what will be approached.

The second section is a literature review. It defines types of violence against women by Brazillian laws and it also delivers studies which evaluate the effects of socioeconomic and health related variables in violence against women. It also provide a brief overview of studies about color, race and colorism. Such section provides a theoretical basis to understand this study and it is also fundamental to comprehend the relevance of such subject.

The third section is methodology. It firstly explains the PCSVDF^{Mulher} in deep, that being the source from all data. And also exposes the scales of color used to classify interviewed women.

The fourth section is divided in three subsections. The first brings to light all the variables used in estimations and what their meanings are. The second is a description of a logit model. The last subsection contains the descriptive statistics. It is first focused on a comparison of the scales of color used, which leads to a discussion about them. And after that, it displays the descriptive statistics of the five models and their equations.

The fifth section contains the results of the estimated models, the meaning of their signals and likely hypothesis for the variables behavior.

Finally, the sixth section contains a summary of the results.[6]

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wave 2 regarding 2017. Nevertheless, only data from wave 2 has been used.

[5]Estimations have been done using stata software.

[6]This section will be followed by the references

2 Literature Review

To understand the purpose of this study, it is necessary to know the meaning and background of key terms. This literature review is divided in two main subsections: the first one gives a definition of the types of violence against women accordingly to Brazilian's laws. After that, it exposes some studies that relate violence against women with other socioeconomic variables.

The second subsection is divided in four: the first one brings to light a comparative of "color" and "race" concepts; the second one shows methods of how to identify race and provides some Brazilian historical background; the third one gives some studies about color and then, knowing the concept of color and race, this subsection ends with studies about colorism. The objective of this literature review is to provide knowledge enough to comprehend the main variables of this study and also to understand the importance of accomplishing it.

2.1 Violence Against Women

Before showing studies about violence against woman, it would be relevant to tell how the most important law to protect women in Brazil was created. In 1945, Maria da Penha was born in Fortaleza, Brazil. In 1983, she suffered a double attempt of feminicide by her husband. First, he shot her on the back, causing her paraplegia and four months later, when she returned home, he tried to electrocute her. Her aggressor was judged in 1991 and in 1996. Nevertheless, both sentences were not fulfilled and he was released.

In 1998, the case became internationally known. However, Brazil remained silent. In 2001, after receiving four documents from the Inter-American Commission in Human Rights (IACHR), the Brazilian state was accused for negligence, omission and tolerance regarding domestic violence.

Unfortunately, Maria da Penha story is the same as many Brazilian women's, who have been battered by their boyfriends, fiances and husbands. Historically, men of that sort have never gone to trial for their violent actions. Nevertheless, due to the absence of legal measures and effective actions to victims of gender violence, in 2002, feminists NGOs started to write a paper that would become known as Maria da Penha law, which was enacted in 2006. According to that law there are, among others, these types of violence

[7]:

i) Item I of art. 7º of Law 11.340/2006 disposes: "Art. 7º, item I. Physical violence, understood as any behavior that offends a woman's integrity or body health;"

ii) Item II of art. 7º of Law 11.340/2006 disposes: "Art. 7º, item II. Psychological violence, understood as any behavior that causes emotional pain and loss of self-esteem or that harms and disturbs her full development or that aims to degrade or control a woman's actions, behaviors, beliefs and decisions, through threat, embarrassment, humiliation, manipulation, isolation, constant vigilance, constant pursuit, insult, blackmail, ridicule, exploitation and limitation of the right of come and go or any other way that harms her psychological health and her self determination."

iii) Item III of art. 7º of Law 11.340/2006 disposes: Art. 7º, item III. Sexual violence, understood as any conduct that embarrasses a woman, to witness, to have or to participate in a non-consensual sexual intercourse, through intimidation, blackmail, coercion, or use of force; that induces her to commercialize or use, in any way, her sexuality, and prevents her from the usage of any contraceptive method or that forces her to get married, to be pregnant, to have an abortion or to prostitute herself, through coercion, blackmail, bribery or manipulation; or that limits her or annuls the exercise of her sexual and reproductive rights."

iv) Item IV of art. 7º of Law 11.340/2006 disposes: Art. 7º, item IV. "Property violence, understood as any conduct defined as retention, subtraction, partial or total loss of a woman's objects, work tools, personal documents, goods, values and rights or economical resources, including those designated to satisfy her needs."

v) Item V of art. 7º of Law 11.340/2006 disposes: Art. 7º, item V. Moral violence, understood as any behavior defined as slander, defamation or injury."

Sadly, there is still a lot to be done in order to protect women. However, that law is a key milestone to protect women's rights.

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[7]In 1994, there was a convention at Belém (Inter-American Convention to Prevent, Punish and Erradicate Violence Against Women), which defined violence against women as any action or conduct based on gender that causes death, damage or psychological, physical and sexual suffering to a woman, either in public or private spheres.

Having such background clear, it is now possible to proceed with this subsection, which aims to expose studies about violence against women.

Regarding economic costs, Buvinic, Morrison & Shifter (1999) studied the costs of violence. In Canada, violence against women generates a direct cost of 684 million Canadian dollars in the justice criminal system and 187 million in the police. The cost of manpower training to combat violence against woman is estimated in 294 Million dollars a year. The total of direct costs exceeds 1 billion Canadian dollars annually and when it comes to non-monetary costs, the World Bank estimates that rapes and domestic violence generate 9 million as the cost of "disability-adjusted life years" (the readjust in life expectancy, decreasing it as a consequence of a deficiency or a problem), lost annually around the world. More than the total for all type of cancers affecting women.

Moreover, effects of economic multiplier in the United States in 1998 shows that 30% of women who were abused lost their jobs as a direct consequence of the abuse. The US Justice Department reports that 94% of abused women lost at least one day of work as a consequence of such abuse. In Canada, 34% of women who have suffered aggression and 11% of raped women showed that they would not be able to work on the day after the abuse. The value of this loss is estimated in 7 million Canadian dollars a year. Also, In Managua, Nicaragua, women who suffer phsical violence earn only 57% as much as their non-abused peers. In Santiago this percentage is 39% (BUVINIC; MORRISON; SHIFTER, 1999)

A study made by Renzetti (2009) corroborates to what had been studied by Buvinic, Morrison & Shifter (1999). Her paper claims that women under strong financial stress tend to have more health problems than other women. She has also found that women who have suffered some abuse face more obstacles to find a job. Thus, social programs of insertion in the labor market do have a positive effect upon the well-being of women.

According to Schneider, Harknett & Mclanahan (2016), general unemployment and economic difficulties at household level are certainly related to abusive relationships. Under higher unemployment, more men become more dominant towards their romantic partners and such behavior remains even when unemployment and economic stress have been adjusted. This result shows that uncertainty and anticipatory anxiety over macroeconomic changes have strong negative effects on the quality of the relationship.

Renzetti (2009) reveals that in periods of economic stress, domestic violence tends to

rise. Moreover, this problem affects every social class, but it is more likely to happen to the poorest individuals with the lowest educational level degree. In periods of economic hardship, intimate partner violence tends to rise. There is an implicit culture in which men should be the providers of the household, and whenever they are not able to accomplish this, more the reason to exercise their dominance by the usage of domestic violence. Nevertheless, when both couple members are working this index tends to decrease.

Benson & Fox (2004) made an analysis using domestic violence as a dependent variable whilst neighborhood's income where couples live, couple's skin color, unemployment index and financial stability as independent variables. Their study concluded that women living in poorer neighborhoods tend to be more assaulted than women who live in richer neighborhoods; unemployed men or men under financial stress tend to be more aggressive and also that skin color does not matter if, and only if, the financial situation of people from different skin tones is similar. In addition to that, men who have experienced an unemployment period bigger than 5 years tend to be more aggressive than men with steady jobs. Financial tension tends to raise domestic violence index.

Finally, to conclude this subsection, Maxwell & Stone (2010) analyzed the impact of three independent variables, unemployment rate; income/poverty and the difference between partners' status in domestic violence. Their results could be summarized in the following table:

Table 1: Maxwell & Stone (2010) results

An increase in the variable	Effect
Unemployment rate	tends to raise the probability of IPV occurrence.
Income	tends to decrease the probability of IPV occurrence.
Difference of partners' status	tends to raise the probability of IPV occurrence.
Unequality	tends to raise the probability of IPV occurrence.

Source: Created by the author using Maxwell & Stone (2010) paper.

2.2 Race, Color and Colorism

Before exploring the concepts and studies about this subsection theme, it is relevant to show the composition of Brazil's population [8]. Table 2 reveals the race or color of Brazilians by federative unit at the year of 2010. [9]

Table 2: Distribution of Brazilian population by race or color in 2010

Federative Unit	White	Black	Yellow	Pardo	Indigenous	Blank
Rondônia	35.32	6.85	1.42	55.63	0.77	0.01
Acre	23.85	5.8	1.89	66.29	2.17	0
Amazonas	21.24	4.13	0.91	68.88	4.84	0
Roraima	20.92	5.85	0.96	61.25	11.02	0
Pará	21.81	7.24	0.91	69.52	0.52	0
Amapá	23.97	8.71	0.99	65.23	1.11	0
Tocantins	24.96	9.12	1.85	63.13	0.95	0
Maranhão	22.13	9.69	1.13	66.52	0.54	0
Piauí	24.35	9.39	2.14	64.02	0.09	0
Ceará	32	4.65	1.25	61.88	0.23	0
Rio Grande do Norte	41.15	5.24	1.04	52.48	0.08	0.01
Paraíba	39.8	5.65	1.29	52.74	0.51	0
Pernambuco	36.67	6.49	0.93	55.3	0.61	0
Alagoas	31.61	6.57	1.18	60.18	0.46	0
Sergipe	28.21	8.9	1.24	61.39	0.25	0
Bahia	22.19	17.1	1.13	59.16	0.4	0
Minas Gerais	45.39	9.22	0.95	44.28	0.16	0
Espírito Santo	42.15	8.35	0.62	48.62	0.26	0
Rio de Janeiro	47.42	12.37	0.77	39.33	0.1	0.01
São Paulo	63.91	5.52	1.35	29.11	0.1	0.01
Paraná	70.32	3.17	1.18	25.09	0.25	0
Santa Catarina	83.97	2.94	0.42	12.41	0.26	0
Rio Grande do Sul	83.22	5.57	0.33	10.57	0.31	0
Mato Grosso do Sul	47.29	4.9	1.22	43.59	2.99	0
Mato Grosso	37.47	7.57	1.14	52.41	1.4	0.01
Goiás	41.68	6.53	1.64	50.01	0.14	0
Distrito Federal	42.19	7.71	1.62	48.24	0.24	0.01
BRAZIL	47.73	7.61	1.09	43.13	0.43	0

All values are in percentage

Source: IBGE - Demographic Census of 2010

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[8] Pardo definition could be seen at page 21

[9] This data came from the classificatory system of color or race by IBGE, which will be explained in the methodology chapter.

In table 2, it is possible to see that Brazil has a lot of miscigenation and the difference of proportions vary a lot in each state.

Table 3 contains Northeastern states, in a decrescent order of percentage of people who identified themselves as blacks. The reason for creating this table is that all data of this study came from such states.

Table 3: Distribution of Brazilian's Northeast population by race or color in 2010

Federative Unit	White	Black	Yellow	Pardo	Indigenous	Blank
Bahia	22.19	17.1	1.13	59.16	0.4	0
Maranhão	22.13	9.69	1.13	66.52	0.54	0
Piauí	24.35	9.39	2.14	64.02	0.09	0
Sergipe	28.21	8.9	1.24	61.39	0.25	0
Alagoas	31.61	6.57	1.18	60.18	0.46	0
Pernambuco	36.67	6.49	0.93	55.3	0.61	0
Paraíba	39.8	5.65	1.29	52.74	0.51	0
Rio Grande do Norte	41.15	5.24	1.04	52.48	0.08	0.01
Ceará	32	4.65	1.25	61.88	0.23	0

All values are in percentage

Source: IBGE - Demographic Census of 2010

It is possible to notice that Northeastern states have a similar composition: "pardos" prevail as race or color in all those states.

Having such pieces of information clear, this literature review can now approach race, color and colorism definitions and studies to enable the reader to better comprehend the subject and importance of this study.

2.2.1 Race versus Color

Searching the concept of race and color in dictionaries, most of them provide definitions similar to these: race is the division of human groups determined by physical and hereditary characteristics, while color is referred to the pigmentation of the skin.

However, there is a blurry line of what is considered to be race or color. For example, black and white are racial categories, but they are also color categories. Therefore, a solid question remains: What is the the difference between the terms?

Telles (2012) reports that in recent years, he has heard some Brazilians saying that "pardo" and black are colors, while "negro" is a race, which reflects the pre-1990 census Brazil. He also says that in Brazil and in the USA, skin color, physical appearance, hair

type and ancestry approach race. In addition to that, he claims that both countries use a classification system based on race or color.

Telles (2012) reveals that Michael Banton argues that U.S scholars followed the ordinary language trend of using "race" instead of "color". For him, color refers to physical differences that are used in society in a form of social distinction. While race is not visible or measurable, it also varies for one place to another and it is hard to be explained. Nevertheless, Osório (2003) in his study, explains ways to identify and measure race.

Telles (2012) argues that, in Brazil, conceptions of "race" and "color" overlap. For him, race and color distinction provokes more questions than answers.

To conclude, it is very difficult to define the distinction between color and race. To avoid this problem, most censuses use both definitions, as in Brazil for example, which has the "Brazilian Classificatory system of Color or Race by IBGE".

2.2.2 Race

This topic has the objetive to brings to light studies about race. How to identify, measure and classify it. Also, there is some Brazilian historic background about the matter.

How to measure race is a challenge because there is a lot of miscegenation around the world and some people prefer to classify themselves not by their hereditary characteristics, but by their culture. In addition to that, the population composition may diverge from one country to another in different degrees. Thus, there are various censuses around the world with different classifications for race.

Osório (2003), for instance, explains that there are five major racial groups in USA: whites; blacks or Afro-Americans; indigenous or native people from Alaska; Asians; natives from the Pacific islands and others. In Canada, there are whites, Chineses, south-Asians, blacks, southwest Asians; Arabians, southeast Asians, Japaneses, Koreans and others.

Osório (2003) also states that there are basically three types of racial identification that could be applied:

i) Self-attribution: the subject who will be classified is the same who does the classification.

ii) Hetero attribution: another person will choose the classification of the subject.

iii) Biological techniques, such as the DNA analysis

Although biological techniques are often extremely accurate, such method does not have a strong social impact because people usually categorize other people's race by what it is perceived and not by their hereditariety.

There are different censuses with the objective to classify people's color and race. Camargo (2009) shows the importance of the creation of IBGE(Brazilian Institute of Geography and Statistics) to Brazil, which has brought many social indicators and also established the classificatory system of color or race. Statistics became, thus, a middle and an end to the political rhetoric of differences.

According to Osório (2003), the current classificatory system of color or race from IBGE has five classifications: black, "pardo", white, Asian and indigenous.

"Pardo" is a term that generates a lot of discussion. Petrucelli (2000) exposes data indicating that such category is more accepted in Rio de Janeiro, Porto Alegre, Salvador and São Paulo. However, in Recife and Belo Horizonte there is some reluctance to accept that category.

One possibility to interpret the meaning of pardo is as the middle term between white and black, which would define pardo as brunette. Nevertheless, as the term brunette may sound rather offensive to some people, it was not used. Pardo could also be interpreted as the result of Brazil's miscegenation.

In order to understand the term "pardo", we will use the definition of Campos (2013), that is, since the first Brazilian census, the "pardo" category has been used to scale the extract of the population who have not classified themselves as whites or as blacks.

That clear, it is now possible to proceed and relate some historic background about race in Brazil. This is necessary because this study will use samples from all Brazil's northeastern states.

The second chapter of Telles (2004) summarizes the process of Brazilian miscegenation. When the Portuguese docked in Brazil, they enslaved the native population and when a huge part of the latter were decimated (by diseases or wars), the Portuguese colonizers started to bring Africans as slave laborers to Brazil. Thus, even under strict disapproval from the Portuguese crown regarding marriages, there was a high index of race mixture. As time went by, the migration of Europeans to Brazil was encouraged by some eugenicists in a very prejudiced attempt to whiten the population. However, Brazil continued as a

very miscegenated country . Some countries might think that Brazil has reached racial democracy. Nevertheless, time has proved them wrong. Slavery traces are present and, sadly, racism is still a problem.

The first chapter of Telles (2004), exposes that there have been three main beliefs about Brazilian race relations, the first claiming there was little or no racial discrimination, the second foreseeing racial discrimination would eventually end and the third affirming race discrimination was persistent, structural and could be defined as the division of human groups determined by physical and hereditary characteristics.

2.2.3   Color

Telles (2012) point that emphasis on color and racial identity are different ways to capture the huge concept of race. Skin color or race are important to examine racial inequality and discrimination.

In his fourth chapter, Telles (2004) claims that there are no rigid rules for racial classification in Brazil, the USA or South Africa. Brazil has many middle categories and has avoided legislating rules for this classification. However, the black social movement is gaining greater legitimacy and it demands a system which excludes the increase of middle categories. Telles also points out that Brazilians clearly make racial or color distinctions that are not necessarily delimited by the cultural characteristics of those in particular racial categories.

Petrucelli (2000), presents data from the PME (monthly research of employment) test, which had a question about color self-attribution in Brazil. Although there were 143 different denominations, only 27 were expressive. Besides that, these 27 classifications could be grouped in fewer because there were terms such as "light brunette", "dark brunette", "mulata", "parda", "light" and "cinnamon", being all quite similar. He also showed that one term, used in different contexts, could have divergent meanings and, in Brazil, the color issue is related to national identity and social practices of discrimination and racial prejudice.

Telles & Paschel (2014) analysing four countries from Latin America (Brazil, Dominican Republic, Panama and Colombia) examined that phenotype (in particular, skin color and hair type) is the primary determinant of racial identity in these countries. However, the extent of its varies within the region.

2.2.4 Colorism

The Oxford Dictionary defines colorism as "prejudice or discrimination against individuals with a dark skin tone, typically among people from the same ethnic or racial group".

Dixon & Telles (2017) studied that color and colorism have been closely related to race and racism in Western societies. Also that, in Latin America, the two sets of concepts have particularly overlapped and that in other parts of the world, especially in Asia, color and colorism have also been important, but have evolved separately from the concepts of race and racism. Therefore, these concepts have had use and meaning which were not consistent across societies. What has been nearly always consistent was a color hierarchy in which white or light skin was considered more desirable and modern, whereas darker skin was considered less valuable and primitive. Which is a reflect of racial prejudice.

Dixon & Telles (2017) exposition about this color hiearchy shows that the problem of racism and colorism still remains in society. Hannon (2015) argues that discrimination based on skin lightness, colorism, is rarely mentioned. And when it is discussed, is in terms of intraracial black-on-black discrimination. He claims that white hegemony requires an acknowledgement not only on white racism, but on white colorism as well. His study results indicated that African Americans and Latinos with lighter skin tones were significantly perceived as more intelligent by white interviewers, what is very concerning, corroborating the prior statement by (DIXON; TELLES, 2017)

Telles & Paschel (2014) found that the idea "money whitens", that is, the more money a person has, more this person will be perceived as whiter, is pervasive in Brazil. However, a growing awareness of racism and positive black identity has created an "education darkening" effect. And their results suggest that whitening through status should not be seen as a rule in Latin America.

It is possible to find many studies about the possible correlation between skin color and economic indicators. Hersch (2008), for example, compared the earning of immigrants of lighter skin color to immigrants of darker skin color. His results showed that lighter skin people do have some advantage, because the difference between their earnings are, on average, 17% higher. In a following study, Hersch (2010) showed that the difference in earnings between the lighter skin color compared to immigrants of darker skin color was on average 16-23% higher. Also, Kreisman & Rangel (2015) found that gaps between lighter-skinned black workers and whites remain constant. In addition to that, Devaraj,

Quigley & Patel (2018) exposed that annual real wages decrease alike each unit increased in darker skin tone, clearly showing it is negatively related to real income.

Hersch (2006) using data from three sources found evidence that African Americans who have lighter skin tone have higher educational attainment than those who have darker skin color. He also found evidence, despite not substantial, that racial difference in wages is attenuated by lighter skin color. Furthermore, he discovered that lighter skin tone is clearly associated to higher employment rates for women and higher educational attainment for women and men.

However, Marteleto (2012) showed that in Brazil, by 2007, those identified as blacks and "pardos" became more similar in their schooling levels, whereas in the past, blacks had greater disadvantages. Her study was, differently from the others, encouraging, because it demonstrated some improvement in the gap created by the difference of color. Nevertheless, the gap still exists.

Thus, it is possible to see the negative effect of colorism in economical factors. However, would this type of discrimination also affect people's health in their social life?

Monk (2015) found that skin color is a significant predictor of discrimination and it does affect the health of people who have suffered this type of discrimination, from problems such as depression and self-rated mental to physical health. Yet, if we consider risky sexual behavior, the study from Landor & Halpern (2016) states that risky sexual behavior has a significantly strong dampen on lighter skin African American and Asians when it is compared with to their darker skin counterparts.

Regardind the difference between the treatment of people based on their skin color, Hersch (2011) found that African Americans of lighter color, and white men of darker color are rated as more attractive and also that African Americans with lighter skin color have reported less discriminatory treatment.

Thus, lamentably, from such studies we can conclude that people of darker skin tones face more problems in their daily lives than people of lighter skin color. However, could this conclusion be applied to intimate partner violence (IPV)? Could women of darker skin color be more prone to suffer IPV because of the implicit prejudice? It is hard to find studies about any possible correlation. [10]. Therefore, the premise of this work is not only innovative but it is also extremely socially important.

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[10]Benson & Fox (2004) contribute to this specific literature

3 Methodology

The objective of this study is to asseess the effect of skin color and socieconomic factors in physical violence. Therefore, in order to do so, it is necessary to explain how variables were defined, built and where they came from. To sum up, it is important to explain the process.

This section has the objective of exposing two main topics: which database was used for the sample and how the skin color tone of the sample was measured.

3.1 Database

The data used in this study came from one source only, the PCSVDF^{Mulher} (Survey of Socioeconomic Conditions and Domestic and Family Violence against Women), which is an inter instintutional and international effort to build a singular dataset to enable the study of domestic violence, the allocation of resources in the household, women and children's health, child development, and the interrelationships among them.

That research was initially formed by a group of four institutions: a leading academic Brazilian university - Federal University of Ceará, Brazil (UFC), a prestigious European center of research - Institute of Advanced Study in Toulouse, France (IAST), a top-rated European University - University of Toulouse, France (UT), and a high Brazilian NGO with extensive experience in gender issues - Maria da Penha Institute, Brazil (IMP). In addiction to that, the project started with a budget from National Secretariat for Women's Policies (SPM) and along its way, it has also received accessory financial support from IAST and the World Bank, Washington.

PCSVDF^{Mulher} used CAPI (Computer-Assisted Personal Inverviewing) data collection technology provided through the World Bank's Survey Solutions: a free CAPI software. The questionnaire developed by the research was organized in a way to approach domestic violence from a modern, rigorous and interdisciplinary perspective. It was applied in all Northeastern capitals region of Brazil [11] and it had two waves. The first one, from 2016, visited 11,411 households and collected precisely 10,094 questionnaires, reaching a success rate of 88,46%. The second wave is from 2017, where the interviewers revisited the households from wave one. Nevertheless, as the third wave is still in its beginning and

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[11]Interviews lasted around 90 minutes.

the results haven't been collected yet, its data are not available yet. This study considers only the second wave.

3.2   The scales of color

As explained, there are three ways to measure racial identification:

i) Self-attribution

ii) Hetero attribution

iii) Biological techniques

Each of them has their flaws and advantages. One critique for self-attribution is that some people might wish to whiten themselves to avoid the experience of prejudice. The hetero attribution may be more accurate then. However, the perception of color of the person who does classify the other could also be biased by their personal beliefs.

The critique for biological techniques is that even if they are able to describe precisely a person's ancestrality, what society in fact considers is how this person looks like. Therefore, to measure the effect of skin tone at a person's daily life, the self-attribution and hetero attribution could be more applicable.

Osório (2003) exposed comparative tables between hetero attribution and self-attribution and the results of both classifications are very similar, presenting a lot of points in common, which means that interviewers and interviewees may share, at some point, the same perceptions of race.

There are many scales designed to measure a person's race or color, such as the Fitzpatrick scale for example, which is a numerical classification that is divided in 6 categories, with type 1 indicating the lighest type of pigmentation and the type 6 indicating the darkest type of pigmentation.

The two scales used at the questionnaire, both taken as reliable, are the NIS Skin Color Scale (designed by Douglas S. Massey and Jennifer A. Martin) and the scale which cames from IBGE (Brazilian Institute of Geography and Statistics). The first one is an 11-point scale, with a range from 0 to 10. By zero representing the albinism and 10 representing the darkest possible skin. That scale was chosen not only because of the size of the range, which contains a broader variety, but also because it is easier to classify a person's tone

and it was tested and used in many representative studies, including in Brazil. The scale can be seen in the following image.

Scale of Skin Color Darkness

1 2 3 4 5 6 7 8 9 10
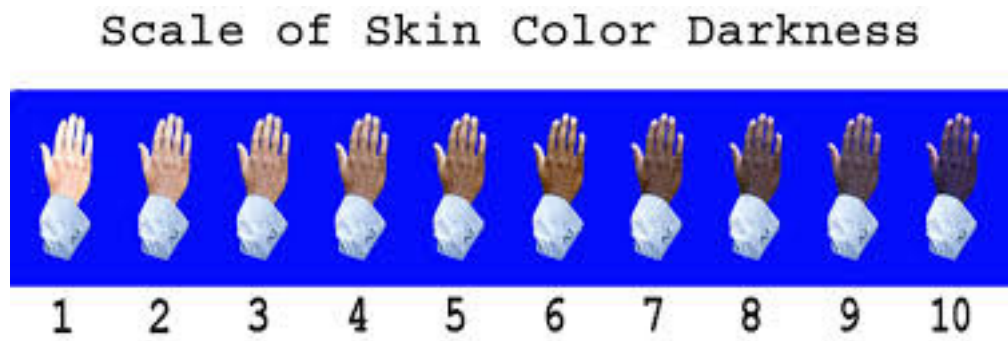
Figure 1: NIS Skin Color Scale. Source: Massey & Martin (2003)

Interviewers answered the scale, not the woman. Thus this scale used hetero attribution.

A minor change in this study was done, the scale that was used has been changed, by adding 1 point to each classification. Thus, it is now from 1 to 11. Therefore, an albino person will be placed as number 1 and a person with the darkest skin tone possible will be number 11.

The classificatory system of color and race from IBGE(Brazilian Institute of Geography and Statistics) is divided in five categories: white, "pardo", black, Asian and indigenous. As the objective of this paper is to analyse colorism, women who classified themselves as indigenous or Asian will not be included in the estimation because in that way it would not be possible to analyse crescent shades of skin color. However, there were very few women that self-classificate themselves in these two categories.

The IBGE scale could be done by self-attribution or by hetero attribution. At the PCSVDF^{Mulher} this scale was used by self-attribution. Therefore, due to the fact that this research has two methods of racial identification and two different scales of skin tone, it will be possible to have a comparative analysis between them. This will be explored in the next chapter.

To conclude, the classification system of color and race from IBGE was also tested and used in different studies, such as (OSÓRIO, 2003)

4 Data

The richness of database from PCSVDF^{Mulher} enables the analysis of a range of very important socioeconomic variables that might influence IPV. They will be fully detailed in this chapter.

Only wave two from PCSVDF^{Mulher}, by the year of 2017, was used in this study. The reason for doing so is that interviewers from the second wave did not necessarily interview the same women from the first wave. As the NIS skin color scale was answered by the interviewers and not by the interviewees, the perception of color might have changed due to the change of the observers (not to mention some physical changes that could have occurred, such as getting tanned). Therefore it is safer to focus on one year to proceed with this study. The reason for choosing the 2017 wave is due to more recent information.

This sample contains women from Brazil's northeastern capitals, São Luís, Teresina, Fortaleza, Natal, João Pessoa, Recife, Maceió, Aracaju and Salvador.

4.1 Variables description

4.1.1 Dependent Variable

i) Physical Violence (phys_vio): it is a binary variable, with value of 0 or 1, with 1 meaning women who have suffered physical violence from their current, ex, most recent or any other partner at least one time in her life; and 0 meaning women who have not experienced it. [12]

4.1.2 Independent Variables

i) Age (age): it is the age of interviewed women.

ii) Squared Age (age^2): The squared age of women in order to generate a quadractic curve and capture effects better.

iii) Education (educ): it measures the highest degree of schooling that the interviewee has achieved. It varies from 1 to 9, with 1 being the least degree of schooling and 9 being its highest level. (1= no schooling; 2= unfinished elementary school; 3=

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[12]It is important to emphasize that this is IPV. It does not contain women who have been victim of violence from someone who was not a romantic partner, for example.

elementary school; 4= high school; 5= unfinished high school; 6= technical course; 7= unfinished undergraduation; 8= undergraduation; 9= graduation).

iv) Civil status (less_atch): it measures the degree of attachment that the interviewee has with her current partner, the question asks if she has a current partner, by 1 representing a high level of commitment and 5 meaning that the women is single. That is, the higher the number, the weaker the involvement. (1= she is currently married; 2= she is living with a partner for more than five years without being married; 3= she is living with a partner for more less than five years without being married; 4= she currently has a partner, but they live in different houses; 5=she is single/alone).

v) Work (work): is a binary variable that captures if the interviewee has a current paid work or not, by 0 meaning she does not have and 1 meaning she does.

vi) Smoker level (non_smoking): it measures the current degree of addiction to tobacco, by 1 being a high level of addiction and 4 meaning she has never smoked (1= she smokes daily; 2= she smokes occasionally; 3= she does not smoke; 4= she has never smoked).

vii) Drinker level (doesnt_drink): it measures the current degree of addiction to alcohol, by 1 meaning a high level of addiction and 6 meaning the interviewee has never drunk (1= she drinks everyday or quite; 2= she drinks once or twice a week; 3= she drinks once or thrice a month; 4= she drinks less than once a month; 5= she does not drink, but has drunk before; 6= she has never drunk)

viii) Mother (mother): it is a binary variable by 0 meaning the woman does not have a child and 1 meaning she had at least one child (including stillbirths).

ix) Color by NIS Skin Color scale (color): it is a scale of color that originally varies from 0 to 10. However, in order to try some cross-correlation, the scale was converted to vary from 1 to 11, by 1 representing the total lack of color (albinism) and 11 representing the darkest possible color.

x) Color by classificatory system of "color or race" from IBGE (colorIBGE): as it was exposed, has five classifications: white, "pardo", black, Asian and indigenous. However, as the objective is to capture colorism, Asian and indigenous classifications

have been excluded from the estimation and converted into missing values, allowing this variable to have three classifications, which were converted in three dummy variables:

x.i) White (D_{white}): has two possible values, either 0 or 1, with 1 meaning that the respondent self-classificated as white.

x.ii) Pardo (D_{pardo}): has two possible values, either 0 or 1, with 1 meaning that the respondent self-classificated as pardo.

x.iii) Black (D_{black}): has two possible values, either 0 or 1, with 1 meaning that the respondent self-classificated as black.

4.2 The logistic regression

In both models, the dependent variable will be "physical violence" and as it is a binary variable by 0 meaning the woman has not suffered such type of violence and 1 meaning that she has, Y being qualitative.

If Y were quantitative, the objective would be to estimate the expected value of physical violence to happen given the regressors. However, as Y is qualitative, the objective is to find the probability of physical violence to happen. Thus, it is a probability model. There are four approaches to formule a probabilistic model for a binary choice variable: linear probability, logit, probit and tobit model.

The linear probability model has some flaws, such as lack of normality in error terms u_i, heterocedastic variances of error terms, impossibility of satisfying $0 \leq E(Y_i|X_i) \leq 1$ and a questionable value of R^2 as a quality measure. Still, the major problem of this model is that it assumes that $P_i = E(Y = 1|X)$ increases linearly along X and it means that the marginal effect of X is always constant.

The logit and probit model do become more adequate, because they correct two aspects:

i) when X_i increases, $P_i = E(Y = 1|X)$ also increases, but it does not stays out of the reach 0-1.

ii) The relationship between P_i and X_i is not linear.

To make this study, two models could be chosen: logit or probit.[13]

The logit model uses a cumulative logistic function, while the probit model emerges from the normal cumulative distribution function. They are quite similar, their main difference is that the conditional probability P_i gets closer to 0 or 1 in a slowly rhythm than in probit.

A logit model was chosen instead of the probit model. However, the choice between them two was arbitrary. Actually, both of them were estimated, but as their results were extremely similar, only the logit estimation will appear in this paper.

The equation of logit model cold be represented as:

$$L_i = ln\left(\frac{P_i}{1 - P_i}\right)$$

Where $\frac{P_i}{1-P_i}$ = odds ratio and $L_i = \beta_1 + \beta_2 X_i + (...) + \beta_{n+1} X_n + u_i$

However, as the angular coefficients do not give the rate of change of probability for a unit of change in the regressor, the marginal effects are required. In this study, the interpretation of results will not be given by the odds ration, but by their marginal effect, which was calculated using stata.

Gujarati (2009) cites some characteristics of the logit model:

i) Although probablities remain between 0 and 1, logits are not limitated. When P goes from 0 to 1 (when the logit L goes from $-\infty$ to ∞)

ii) Despite L being linear in X, probabilities are not.

iii) If the logit L is positive, it means that when the value of the regressor increases, the odds of the regressand being equals 1 also increases. If L is negative, the odds of the regressor being equals 1 decreases as the value of X increases.

iv) Instead of using the t statistic to evaluate the statistic significance of a coefficient, the Z statistic(normal) is used. Therefore, the inferences are based on the standard normal table. It is also relevant to explain that if the size of the sample is reasonably large, the t distribution will converge to a normal distribution.

v) The conventional measure of adjustment quality, R^2, it is not particularly significant to models with binary regressand. Nevertheless, in models with a dichotomic

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[13]Tobit model is an extension of probit with a different purpose. See Wooldridge (2015) for further details.

regressand, the quality of adjustment is of secondary importance. What really matters are the expected signals of the coefficientes of the regression and their statistic significance.

vi) Differently from the linear probability model, the angular coefficients do not bring the rate of change of probability for a unit of change in the regressor. It is required to calculate the marginal effects.

vii) In the logit model, the angular coefficient of a variable gives the variation in the logarithm of the odds ratio associated to a unit variation in that variable, keeping all the other variables constant. However, to the logit model, the rate of change in the probability of an event occurring is given by $B_j P_i (1 - P_i)$, when B_j is the coefficient of the "jth" regressor, but when evaluating P_i, all the variables included in the analysis are involved.

4.3 Descriptive statistic

4.3.1 Color scales

Table 4 contains data from women who, in 2017, classified themselves using the IBGE scale and that who were also classified by NIS skin color scale by interviewers. However, as some variables had missing values, this table only contains women who are shown in the estimated models. All the values are in percentage.

Table 4: Comparative of scales

color/coloribge	White	"Pardo"	Black	Total
1	0.00	0.00	0.00	0.00
2	4.42	0.93	0.11	5.46
3	8.02	9.51	0.78	18.31
4	5.68	19.60	3.09	28.38
5	2.02	14.38	4.22	20.62
6	0.65	6.50	4.42	11.57
7	0.41	3.07	3.87	7.35
8	0.26	1.54	3.05	4.85
9	0.00	0.39	1.94	2.33
10	0.00	0.11	0.81	0.93
11	0.00	0.02	0.19	0.20
Total	21.46%	56.05%	22.49%	100.00%

Source: Created by the author.

It is possible to see that most of women identified themselves as "pardas" (feminine of "pardos"), 56.05%, and white and black almost had the same percentage, 21.46% and 22.49% respectively.

One interesting fact is that some women who classified themselves as white were classified by the interviewers as people of a darker tone (a person classified from 5, 6 up to 7 by NIS Skin Color scale may not be considered white).

Another interesting fact is that women who classified themselves as "pardas" varied from 2 to 10 by NIS scale, showing that the concept of "pardo" may be highly heterogenous among people. Women classified from 8 to 11 by NIS skin color scale might wish to whiten themselves, while women from 2 to 3 may not feel white. However, it is interesting to see women classified as 2 consider themselves as "pardas", because number 1 represents albinism[14] and a person who is classified by 2, excluding albinos, has the lighest skin color possible. Anyway, most women who classified themselves as "pardas" are between 3 to 5 by NIS scale. This may help to understand people's conception of the term "pardo".

Women who considered themselves black were classified by the interviewer from 2 to 11 by NIS skin color scale. That is atypical and should not happen. A possible explanation for that is some interviewers could have marked the wrong option while running the questionnaire. However, only few women were classified below the number 4 by NIS skin color scale.

Three graphs were made using data from table 4 and they are show next. The X-axis presenting numbers by NIS skin color scale and the Y-axis contains percentage of women who were classified by that number.

These graphs are helpful for the comparison: hetero atribution versus self-attribution. It is possible to see that most of them agree among themselves, but there are more divergences than expected and it shows that skin tone perception could vary depending on the interviewer's point of view.

To help understanding the graphics of figure 2, table 5 provides a descriptive statistics of it.

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[14]Remember that at this study, this scale was changed. The original variation of 0 to 10 became a range from 1 to 11

Figure 2: Comparative with scales. Source: Created by the author using stata

Table 5: Descriptive statistic, comparative of scales

Variable	Observation	Mean	Std. Dev.	Variance	Skewness	Kurtosis
white	1,159	3.47368	1.22543	1.50168	1.14959	4.77866
pardo	3,028	4.60865	1.33381	1.77907	0.86510	3.98755
black	1,215	6.30288	1.82119	3.31675	0.22585	2.43357

Source: Created by the author.

It is possible to notice that in all three categories, there is a positive assimetry. However, their tail is different. In addiction to that, women who classified themselves as black are more disperse in the graphic, what might be an indicator of misclassification.

The table and graphics above are regarding interviewed women from all nine states of Brazil's Northeast. But in order to provide more information and generate more discussion, figure 3 and table 6 contain only data of interviewed women from Bahia, Maranhão and Piauí. The reason for that comes from 2010 IBGE census: those are the states where
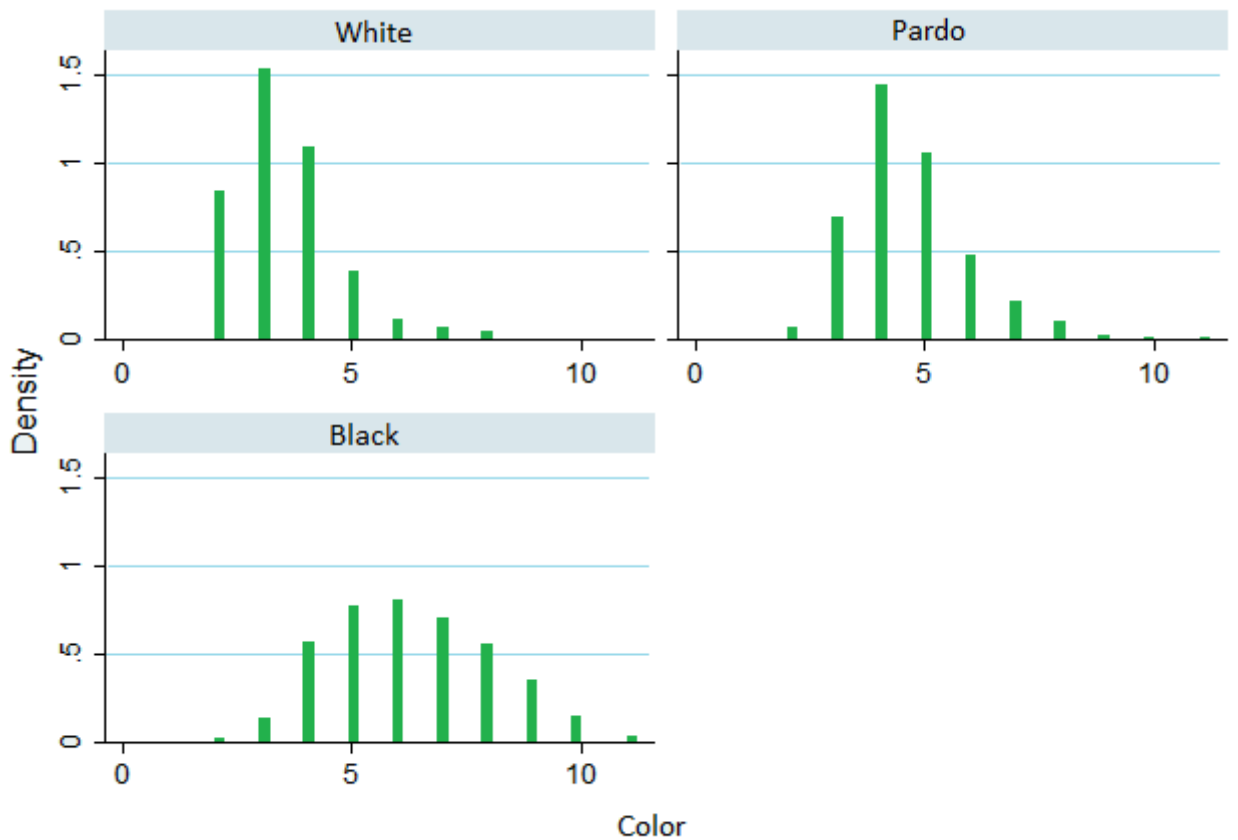
more people classified themselves as black.
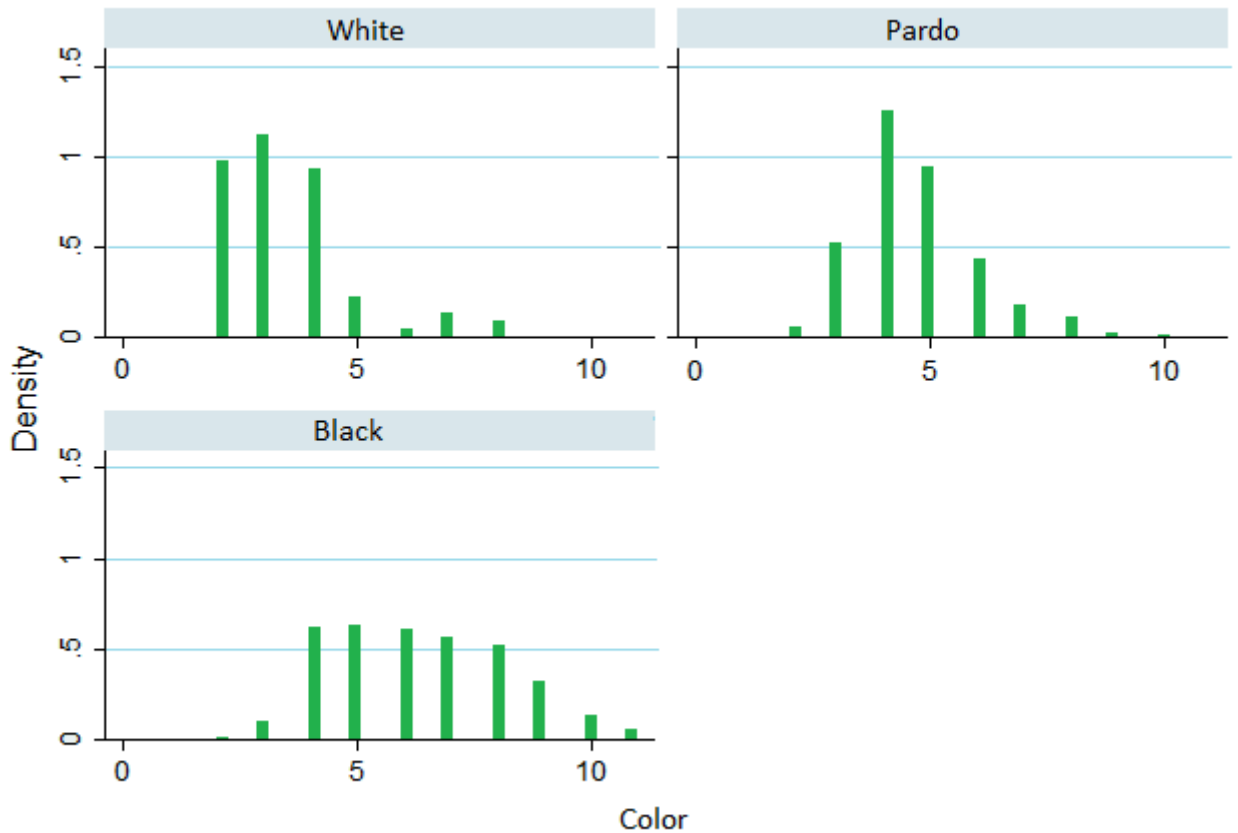
Figure 3: Comparative with scales (BA, MA, PI). Source: Created by the author using stata

Table 6: Descriptive statistic, comparative of scales (BA, MA, PI)

Variable	Observation	Mean	Std. Dev.	Variance	Skewness	Kurtosis
white	262	3.45038	1.42077	2.01860	1.36553	4.89128
pardo	1,010	4.68019	1.35761	1.84311	0.91548	4.14879
black	593	6.34064	1.89469	3.58984	0.30244	2.29988

Source: Created by the author.

It is interesting to notice the difference between the ratio of women who classified themselves as black to white when the sample contain the 9 states and when the sample contains only Bahia, Maranhão and Piauí. Whereas in the nine states, the ratio is almost 1, in those three states the ratio is more than double. However, the graphics and their mean are similar.

4.3.2 Summary of variables

Finally, to conclude this subsection, there is the descriptive statistic of the estimated models and also their equations.

Five models were estimated, all of them have the same regressand and the regressors vary only in the variable which measures skin tone. Thus, their regressand is physical violence (phys_vio) and they contain the following independent variables in common: age, squared age (age^2), education (educ), civil status (less_atch), work, smoker level (non_smoking), drinker level (doesnt_drink) and if the woman has had a child (mother). [15]

The variable that measures the skin color in the first model is the one which represents the skin tone by NIS skin color classification (color), it will vary from 1 to 11, with 1 representing total lack of color and 11 representing the highest dark skin color tone.

First model equation:

$$phys\_vio = ln\left(\frac{P_i}{1 - P_i}\right) = \beta_1 + \beta_2 age + \beta_3 age^2 + \beta_4 educ + \beta_5 less\_atch+$$

$$beta_6 work + \beta_7 non\_smoking + \beta_8 doesnt\_drink + \beta_9 mother + \beta_{10} color + u_i$$

Table 7: Descriptive statistic of variables used in the first model

Variable	Observation	Mean	Std. Dev.	Min	Max
phys_vio	5,456	0.17448	0.37956	0	1
age	5,456	34.18255	9.52605	15	52
age^2	5,456	1259.176	654.871	225	2704
educ	5,456	4.68145	1.89651	1	9
less_atch	5,456	2.76173	1.63342	1	5
work	5,456	0.43346	0.49559	0	1
non_smoking	5,456	3.72031	0.754243	1	4
doesnt_drink	5,456	4.57111	1.47142	1	6
mother	5,456	0.71206	0.45284	0	1
color	5,456	4.74725	1.71874	2	11

Note: some values are aproximated.

Source: Created by the author.

The variables that measure skin tone in the second model are the dummies created

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[15] For a better explanation, a table summarizing the models will me shown at the end of this subsection.

using the classificatory system of "color or race" from IBGE. The dummy called D_{white} is not included in the model because if we do not exlude one dummy variable, it is possible to get caught at dummy variable trap, which supposes perfect multicolinearity.

Table 8: Descriptive statistic of variables used in the second model

Variable	Observation	Mean	Std. Dev.	Min	Max
phys_vio	5,730	0.17766	0.38226	0	1
age	5,730	34.18674	9.51030	15	52
age^2	5,755	1259.163	653.7928	225	2704
educ	5,730	4.66422	1.88951	1	9
less_atch	5,755	2.75357	1.63271	1	5
work	5,730	0.43158	0.49534	0	1
non_smoking	5,730	3.71640	0.76012	1	4
doesnt_drink	5,730	4.56876	1.47080	1	6
mother	5,730	0.71378	0.45202	0	1
D_{pardo}	5,730	0.55602	0.49689	0	1
D_{black}	5,730	0.22338	0.41655	0	1

Note: some values are approximated.

Source: Created by the author

Second model equation:

$$phys\_vio = ln\left(\frac{P_i}{1 - P_i}\right) = \gamma_1 + \gamma_2 age + \gamma_3 age^2 + \gamma_4 educ + \gamma_5 less\_atch + \gamma_6 work+$$

$$\gamma_7 non\_smoking + \gamma_8 doesnt\_drink + \gamma_9 mother + \gamma_{10} D_{pardo} + \gamma_{11} D_{black} + v_i$$

The third, fourth and fifth model have almost the same equation of the first model. Nevertheless, the first model captures women's skin color tone using only the variable referent to the NIS skin color scale (color), whereas in the third, fourth and fifth model, there is an interaction between the two scales of color used. The three last models contain the variable (color), but the third model contains only women who considered themselves white, the fourth model contains only women who considered themselves "pardas" and the fifth model contains only women who considered themselves black. The reason for dividing this interaction in three models is to capture the possible effect of colorism in the three IBGE classifications separately.

Table 9 shows that women who considered themselves white are more concentrated among numbers 2 to 5 by NIS skin color scale.

Table 9: Descriptive statistic of variables used in the third model (colorIBGE=white)

Variable	Observation	Mean	Std. Dev.	Min	Max
phys_vio	1,159	0.13805	0.34510	0	1
age	1,159	34.88438	9.60536	15	52
age^2	1,159	1309.104	669.21510	225	2704
educ	1,159	4.97670	1.99489	1	9
less_atch	1,159	2.68248	1.67712	1	5
work	1,159	0.44521	0.49720	0	1
non_smoking	1,159	3.78429	0.65714	1	4
doesnt_drink	1,159	4.72562	1.42296	1	6
mother	1,159	0.67213	0.46964	0	1
color	1,159	3.47368	1.22543	2	8

Note: some values are approximated.

Source: Created by the author

Table 10: Descriptive statistic of variables used in the fourth model (colorIBGE=pardo)

Variable	Observation	Mean	Std. Dev.	Min	Max
phys_vio	3,028	0.17470	0.37977	0	1
age	3,028	33.92768	9.55261	15	52
age^2	3,028	1242.309	652.9315	225	2704
educ	3,028	4.59247	1.85990	1	9
less_atch	3,028	2.74504	1.61091	1	5
work	3,028	0.42602	0.49457	0	1
non_smoking	3,028	3.72622	0.74721	1	4
doesnt_drink	3,028	4.59709	1.46046	1	6
mother	3,028	0.73216	0.44290	0	1
color	3,028	4.60865	1.33382	2	11

Note: some values are approximated.

Source: Created by the author

Table 10 shows women who considered themselves "pardas" would be more concentrated among numbers 3 to 6 by NIS skin scale of color. If we compare this finding to the one from table 9, it is possible to evidence that the conception of pardo does vary from person to person.

Table 11: Descriptive statistic of variables used in the fifth model (colorIBGE= black)

Variable	Observation	Mean	Std. Dev.	Min	Max
phys_vio	1,215	0.20411	0.40322	0	1
age	1,215	34.1251	9.34851	15	52
age^2	1,215	1251.845	642.2581	225	2704
educ	1,215	4.63045	1.86335	1	9
less_atch	1,215	2.87407	1.63763	1	5
work	1,215	0.44115	0.49673	0	1
non_smoking	1,215	3.64444	0.84674	1	4
doesnt_drink	1,215	4.35391	1.52352	1	6
mother	1,215	0.69629	0.46005	0	1
color	1,215	6.30288	1.82119	2	11

Note: some values are approximated.

Source: Created by the author

Table 11 shows women who considered themselves black usually are more concentrated among numbers 5 to 8 by NIS skin color scale. Women who were classified between 2 and 3 of that scale were exceptions. (What may be concluded analysing figure 2 and table 4).

Finally, as all five models have the same regressand and their regressors only vary in the variable who measures skin color. The table 12 summarizes how women's skin tone was captured in the five models:

Table 12: Summary of the five models

	Scale of sin color used	How it was used
Model 1	NIS skin color scale	It varies from 1 to 11 $\uparrow$ number, $\uparrow$ skin color.
Model 2	Classificatory system from IBGE	Effect captured by dummies D_{pardo} and D_{black}
Model 3	Both scales	Only women selfclassificated as whites are in this model
Model 4	Both scales	Only women selfclassificated as "pardas" are in this model
Model 5	Both scales	Only women selfclassificated as blacks are in this model

Source: Created by the Author.

5 Results

Table 13: Marginal effects after logit (Model 1 and 2)

	phys_vio(1)	phys_vio(2)
age	0.01739***	0.01820 ***
	(4.15)	(4.40)
age^2	-0.00024***	-0.00025***
	(-4.07)	(-4.29)
educ	-0.02145***	-0.02344***
	(-7.53)	(-8.35)
less_atch	0.02737***	0.02844***
	(9.06)	(9.57)
work	-0.01535	-0.01746†
	(-1.52)	(-1.76)
non_smoking	-0.02679***	-0.02579***
	(-4.77)	(-4.66)
doesnt_drink	-0.01815***	-0.01760***
	(-5.5)	(-5.39)
mother	0.06841***	0.06506***
	(6.39)	(6.09)
color	0.00913***	
	(3.33)	
D_{pardo}		0.01597
		(1.27)
D_{black}		0.03523*
		(2.20)
Observations	5,456	5,730
LR chi2(9)/(10)	352.70	365.53
Prob > chi2	0.0000	0.0000
Pseudo R2	0.0698	0.0682

z statistics in parentheses

† $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$,

Source: Created by the Author.

Table 13 contains results of the first and second models. Except "work", all variables in common of both models are strongly significant (p<0.001). They present a considerable, 5456 and 5730. Moreover, estimations are reliable (Prob>chi2 = 0.0000).

The sign of "age" indicates that older women are more prone to suffer physical violence. Nevertheless, the sign of "age^2" indicates that at a certain age, the propensity to suffer physical violence tends to decrease, instead. Thus, age grafically has a parabolical behavior.

Education has a negative sign, representing that each degree up in education decreases the probability of suffering physical violence, 2.1% in the first model and 2.3% at the second model, roughly. The interpretation of this variable effect is extremely important. It indicates that more educated women will be less proned to tolerate physical violence. The reasons behind that could be diverse. It could be because women feel more capable of finding a good job and that means they do not need anybody to help them with their finances, or because the educational environment shows them how much IPV is a serious problem or even because they feel more confident. But whatever the reason is, it shows for certain that education generates positive externalities.

The positive sign of "less_atch" shows the less involvement a woman has with a partner, the less is the probability for her to suffer physical violence from an intimate partner. One possible reason for that is that aggressors usually do not hit their partner at the first fight, they usually practice psychological violence before. They steal women's self-esteem and make them dependent. In this way, women do not pay attention to the signs indicating their partners may perpetrate physical violence. Thus, when a woman is not very involved with a partner,at the first sign of aggressive behavior from her partner, she is more prone to break up the relationship before violence occurs. It is easier to leave the relationship. However, this hypothesis does not apply for women who have suffered violence from their ex and not by the current partner. Still, there are many possible interpretations for this independent variable behavior.

Work is only significant in the second model and only if its significance degree is 10%. Thus, in the first model, the fact of women having a paid work or not does not relate to the propensity of suffering physical violence.

The signs of "non_smoking" and "doesnt_drink" indicate that being less addicted to smoking and drinking reduces the probability of these women to suffer this type of

violence.

The positive sign of "mother" shows that if a woman had at least one child, the probability of suffer physical violence increases. This may be explained by the erroneous thought that women would tolerate such type of violence in order to maintain whatever wellbeing of their children.

Finally, in the first model, it is possible to see that when the skin tone of a woman increases one degree, the probability of her suffering physical IPV is 0.9% higher. This finding evidences that colorism affects on physical violence regardless the woman's self-rating and it also exposes one more way of color prejudice manifestation.

In the second model, the dummy variable "D_{pardo}" is not significant. It shows that being "pardo" does not affect physical violence. Nevertheless, the dummy variable, "D_{black}" is significant indeed and demonstrantes the fact that women who considered themselves as "black" would have a 3.2% higher probability of suffering physical violence.

The other three models results are exposed in table 14 and as the signals of the common variables in all five models match, their interpretation will not be done again.

What is really interesting about these three models is that color is not significant when women considered themselves "white" or "pardo". However, it is significant when they considered themselves "black". Again,it does show women under such rating have a probability 1.5% higher of suffering physical violence. That evidences colorism only affects physical IPV when the woman is black.

Such discoveries are extremely preoccupying. They prove racism persist and a lot more efforts are needed in order to eradicate this type of discriminatory behavior.

Table 14: Marginal effects after logit. (Models 3, 4 and 5)

	white phys_vio(3)	pardo phys_vio(4)	black phys_vio(5)
age	0.01885*	0.01419*	0.02505*
	(2.37)	(2.53)	(2.55)
age^2	-0.00027*	-0.00019*	-0.00035*
	(-2.39)	(-2.39)	(-2.55)
educ	-0.02146***	-0.02333***	-0.01936**
	(-4.28)	(-5.87)	(-2.99)
less_atch	0.03112***	0.02525***	0.02956***
	(5.67)	(6.12)	(4.25)
work	0.00142	-0.01905	-0.02615
	(0.07)	(-1.40)	(-1.14)
non_smoking	-0.02166†	-0.02494***	-0.03668**
	(-1.88)	(-3.22)	(-3.15)
doesnt_drink	-0.01336*	-0.01865***	-0.01876**
	(-2.09)	(-4.15)	(-2.53)
mother	0.04106*	0.05712 ***	0.11065***
	(2.04)	(3.77)	(4.81)
color	0.00341	0.00308	0.01523*
	(0.46)	(0.64)	(2.50)
Observations	1,159	3,028	1,215
LR chi2(9)	75.14	171.97	102.65
Prob > chi2	0.0000	0.0000	0.0000
Pseudo R2	0.0808	0.0613	0.0835

z statistics in parentheses

† $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Created by the Author.

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6   Final Considerations

This study was realized using data from the second wave of PCSVDF^{Mulher} (Survey of Socioeconomic Conditions and Domestic and Family Violence against Women). It contains data of women from all the capitals of Brazilian Northeast in 2017.

PCSVDF^{Mulher} data made possible to analyse the divergences between hetero attribution and self-attribution, since two scales of color with different ways to identify skin tone were used at the questionnaire.

The analysis of the two scales, NIS skin color scale and IBGE classificatory system of color or race, was surprising at some points. There where women with a dark skin tone (7-8 at NIS scale) considering themselves whites, probably in an attempt to whiten themselves. While there were women that classified themselves black, but the interviewer considered them as people with very a very light skin tone (2-3). However, these showings were outliers.

Women who classified themselves white are mostly at the range of 2 to 4 at NIS skin color scale, while women who classified themselves "pardas" are mostly at the range of 3 to 6 and women who classified themselves blacks are mostly at the range of 5 to 8. These results corroborates to the thinking that the definition of pardo is really controversial, due to the fact that the number 3 represents a person with a very light skin tone.

Five models were estimated using logistic regression in order to see the possible effect of a woman's skin tone and other socioeconomic variables in the probability to suffer physical violence.

In models with a dichotomous regressand, the quality of adjustment is of secondary importance and what really matters are the expected signals of the coefficients of the regression and their statistical significance.

Thus, analysing the statistical significance, the variable "work" is insignificant in all models if the considered degree of significance is 5%

The first model reveals that one degree up of skin tone at NIS skin color scale represents an increase at the probability to suffer physical IPV. The second model brings to light that the dummy variable D_{pardo} is not significant, while the dummy variable D_{black} is and it also has a positive sign, which means that the probability to suffer physical domestic violence tends to raise if the woman is black. This reveals one more form of racial discrimination, which is corroborated by the foundings at the third, fourth and fifth model, where variable

color is not significant if the interviewed woman identified herself as white or pardo. However, it is significant when she identified herself as black with a positive sign.

The other variables were all significants. "Age", "mother" and "less_atch" had positive signs. Which means that the probability to suffer physical domestic violence tends to raise when the woman gets older, when she gets more envolved with her partner and if she is a mother.

The variables "age^2", "educ", "non_smoking" and "doesnt_drink" had negative signs. Which means that variable age has graphically a parabolical behavior, when a woman reaches certain age, the probability to suffer physical violence tends to decrease. And also that having more education, being a non smoker and not drinking tend to decrease this probability too.

These results sadly show Brazil has not reached racial democracy and they also corroborate the definition of Brazilian race relations brought by Telles (2004), which states race discrimination is persistent and structural.

References

BENSON, M. L.; FOX, G. L. *When Violence Hits Home: How Economics and Neighborhood Play a Role.* [S.l.], 2004.

BUVINIC, M.; MORRISON, A. R.; SHIFTER, M. Violence in the americas: a framework for action. *Too close to home: Domestic violence in the Americas*, 1999.

CAMARGO, A. d. P. R. Mensuração racial e campo estatístico nos censos brasileiros (1872-1940): uma abordagem convergente. *Boletim do Museu Paraense Emílio Goeldi. Ciências Humanas*, Museu Paraense Emílio Goeldi, v. 4, n. 3, p. 361–385, 2009.

CAMPOS, L. A. O pardo como dilema político. *Insight Inteligência*, v. 62, p. 80–91, 2013.

DEVARAJ, S.; QUIGLEY, N. R.; PATEL, P. C. The effects of skin tone, height and gender on earnings. *PLOS ONE*, 2018.

DIXON, A. R.; TELLES, E. E. Skin color and colorism: Global research, concepts, and measurement. *Annual Review of Sociology*, Annual Reviews, v. 43, p. 405–424, 2017.

GUJARATI, D. N. *Basic econometrics.* [S.l.]: Tata McGraw-Hill Education, 2009.

HANNON, L. White colorism. *Social Currents*, SAGE Publications Sage CA: Los Angeles, CA, v. 2, n. 1, p. 13–21, 2015.

HERSCH, J. Skin-tone effects among african americans: Perceptions and reality. *American Economic Review*, v. 96, n. 2, p. 251–255, 2006.

HERSCH, J. Profiling the new immigrant worker: The effects of skin color and height. *Journal of Labor Economics*, The University of Chicago Press, v. 26, n. 2, p. 345–386, 2008.

HERSCH, J. The persistence of skin color discrimination for immigrants. *Social Science Research*, 2010.

HERSCH, J. Skin color, physical appearance, and perceived discriminatory treatment. *The Journal of Socio-Economics*, 2011.

KREISMAN, D.; RANGEL, M. A. On the blurring of the color line: wages and employment for black males of different skin tones. *The Review of Economics and Statistics*, 2015.

LANDOR, A. M.; HALPERN, C. T. The enduring significance of skin tone: Linking skin tone, attitudes toward marriage and cohabitation, and sexual behavior. *Journal of youth and adolescence*, Springer, v. 45, n. 5, p. 986–1002, 2016.

MARTELETO, L. J. Educational inequality by race in brazil, 1982-2007: Structural changes and shifts in racial classification. *Population Association of America*, 2012.

MASSEY, D. S.; MARTIN, J. A. The nis skin color scale. *Office of Population Research, Princeton University*, 2003.

MAXWELL, C. D.; STONE, R. J. G. *The Nexus between Economics and Family Violence: The Expected Impact of Recent Economic Declines on the Rates and Patterns of Intimate, Child and Elder Abuse.* [S.l.], 2010.

MONK, J. E. P. The cost of color: Skin color, discrimination, and health among african-americans. *American Journal of Sociology*, 2015.

OSÓRIO, R. G. O sistema classificatório de cor ou raça do ibge. Instituto de Pesquisa Econômica Aplicada (Ipea), 2003.

PETRUCELLI, J. L. *A cor denominada: Um estudo do suplemento da PME de Julho/98.* [S.l.]: Texto, 2000.

RENZETTI, C. M. Economic stress and domestic violence. *VAWnet*, 2009.

SCHNEIDER, D.; HARKNETT, K.; MCLANAHAN, S. Intimate partner violence in the great recession. *Population Association of America*, 2016.

TELLES, E. The overlapping concepts of race and colour in latin america. *Ethnic and Racial Studies*, Routledge, v. 35, n. 7, p. 1163–1168, 2012. Disponível em: <https://doi.org/10.1080/01419870.2012.657209>.

TELLES, E.; PASCHEL, T. Who is black, white, or mixed race? how skin color, status, and nation shape racial classification in latin america. *American Journal of Sociology*, v. 120, n. 3, p. 864–907, 2014. Disponível em: <https://doi.org/10.1086/679252>.

TELLES, E. E. *Race in another America: The significance of skin color in Brazil.* [S.l.]: Princeton University Press, 2004.

WAISELFISZ, J. J. *Mapa da violência 2015: homicídio de mulheres no Brasil.* [S.l.]: Flacso Brasil, 2015.

WOOLDRIDGE, J. M. *Introductory econometrics: A modern approach.* [S.l.]: Nelson Education, 2015.