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Sociodemographic profiles of Indigenous households in the 1991, 2000, and 2010 censuses

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Abstract *This article analyzes the sociodemographic composition of the Indigenous population in Brazil in the 1991, 2000, and 2010 demographic censuses, in addition to investigating inequalities in access to basic sanitation and electricity based on the 2010 Census. A methodology is proposed that classifies households with Indigenous residents as "homogeneous", "mixed" with an Indigenous in the category "household head", and mixed with a non-Indigenous in the category "household head". Regional and situational differences overlapped with differences by type of household and location, with better conditions in urban than rural areas and in the Southeast and South. The North was the region with the least access in general. Regional differences and differences between urban/rural areas were observed, highlighting better urban conditions in the Southeast and South. These inequalities reflect fragmented public policies, economic pressures, and deterritorialization, among other factors. The development of new techniques and critical debate is essential to understanding and addressing racial inequalities in the country and promoting public policies appropriate to Indigenous peoples.*
Key words *Indigenous peoples, Census, Demography, Public policy*

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Introduction

The demographic censuses conducted by the Brazilian Institute of Geography and Statistics (IBGE) are crucial sources of data on the sociodemographic characteristics of the Brazilian Indigenous population for their coverage and the possibility of investigating a wide range of topics[1-6]. It is a "mosaic of micro-societies with small or medium-sized populations, with distinct demographic dynamics, revealing not only cultural autonomies but also very different epidemiological states or quality of life"[7]. Although censuses cannot portray the specificities of each population, their relevance to public policy purposes is undeniable[6-9]. The population contingents enumerated by national censuses are commonly used in calculating numerous health indicators (generally as denominators)[10-12].

Since the change in the skin color question to skin color or ethnicity in the 1991 Census, when the category "Indigenous" was introduced, a historical series started to serve as a reference for several studies on the demographics of Indigenous peoples and analyses on inequality patterns focusing on this segment of Brazilian society[2,3,5,9,13,14]. The skin color issue, applied between the 1940 and 1980 Censuses, except for 1970, offered the options "White", "Black", "Yellow", and "Brown", and the IBGE[2] classified as "brown" Indigenous declarations. The language spoken (including Indigenous language) was investigated in 1950 and 1960. The other two occasions on which the Indigenous population was censused occurred in 1872 and 1890[15,16]. The collection of information on Indigenous language spoken at home and specific ethnic affiliation (i.e., Indigenous ethnic groups) was introduced in the 2010 Census.

The IBGE collected data on the Indigenous population in the last four demographic censuses carried out in the country in 1991, 2000, 2010, and, most recently, 2022. This population segment is distributed across all federation units and in most Brazilian municipalities, with spatial distribution patterns distinct from the Brazilian population in general. According to the 2022 Census, 4,832 (87.8%) of the 5,568 municipalities in the country had at least one Indigenous declaration[17]. These peoples' sociodiversity was evidenced by the results of the 2010 Census, which identified 305 ethnic groups and 275 Indigenous languages spoken in the country[18]. The number of Indigenous peoples showed a progressive increase throughout the censuses, with significant differences between the 1991 and 2000 Censuses, up from 294,131 to 734,128 individuals, and between the 2010 and 2022 Censuses, up from 896,917 to 1,693,535 declared Indigenous peoples. The 2000 Census, in turn, highlighted the presence of Indigenous people in urban contexts, identifying a number 5.4 times greater in these areas and, in rural areas, 1.5 times greater than in the 1991 Census. Most of the population resided in rural areas in the 1991 and 2010 Censuses.

Oliveira highlights, regarding the possible reasons for the increase in the Indigenous population in official statistics since the 1990s, the interrelations between the Indigenous issue and the environmental agenda; the international guidelines regarding the participation of civil society in planning and decisions related to public policies; escalating the international agenda for discussing and establishing agreements and conventions related to the rights of Indigenous peoples; and the growing appreciation of identities and cultural heritage of these populations by the Brazilian government and perceived globalized world trends[19]. Other factors that somehow dialogue with the reasons presented by Oliveira include adopting the skin color or ethnicity issue in other information systems and inequality studies; the "volatile" classification of skin color or ethnicity issue; and methodological innovations for the investigating Indigenous peoples in demographic censuses, among other factors[6-20].

This article aims to analyze the composition by skin color or ethnicity in households with at least one Indigenous declaration through a household typology and measure the inequality between the proposed types in access to primary services to investigate differences between the observed population subgroups. The sociodemographic analysis of declared Indigenous people uses data from the 1991, 2000, and 2010 Census samples to sociodemographically characterize and identify significant patterns and differences between types of households. The analysis of access to services by type of residence, in turn, uses data from the 2010 Census universe, as these allow for greater spatial disaggregation in estimating values, emphasizing inequalities not observed in the sample data, such as between Indigenous people inside and outside Indigenous lands. Using data from the universe also facilitated using a coverage question for Indigenous identification, which increased the total number of individuals considered by 8.8%.

This is an unprecedented approach in research using census data, as it encompasses three

recent national censuses. It uses a new typology of households per composition of different arrangements by skin color or ethnicity of residents, exceeding the Indigenous and non-Indigenous categories[4,11]. In this sense, the study has a dimension of methodological proposition by indicating a typology for households with Indigenous presence to analyze inequalities by skin color or ethnicity, remembering that other authors also used arrangements by skin color or ethnicity to analyze census data geared to Indigenous populations[21-23].

Methods

The household dimension is central to building and analyzing indicators in the health field, such as sanitation infrastructure and other public services. According to the IBGE methodology, households can be classified as private (permanent or improvised) or collective. Permanent private households serve exclusively as housing; improvised households are located in buildings without an area exclusively intended for housing, such as stores and factories. In both cases, relationships are governed by "kinship ties", "domestic dependency ties", or "socialization rules", according to IBGE terminology[24]. Hotels, motels, campsites, boarding houses, penitentiaries, prisons, and detention centers represent collective households. In these households, relationships are based on "administrative subordination rules"[24]. This study only considered individuals living in permanent and improvised private homes.

Considering the variations observed in the three censuses regarding the Indigenous population regarding volume and urban-rural distribution, among other dimensions, this research compares, firstly, the ethnic-racial composition, structure by gender and age, the relationship between residents, number of residents, and spatial distribution of declared Indigenous people per the proposed household type, to highlight significant patterns and differences between the observed population subgroups. We used microdata from the 1991, 2000, and 2010 Census samples for this analysis since those for 2022 are not yet available for research.

Then, we proceeded to classify the data from the 2010 Census universe using the same criteria adopted for the sample data and adding the variables "Do you consider yourself Indigenous?" (yes or no) and location regarding Indigenous lands (inside or outside), not available in the sample data, and those related to basic sanitation and electricity infrastructures. Only permanent households were considered to characterize and analyze access to services since the IBGE does not collect this information for improvised households. Using this database, we characterized and measured access to services and conditions observed among Indigenous people declared in the 2010 Census using multivariate statistical modeling.

The choice of only one period for the analysis of sanitation and electricity conditions (2010) was due to the potential analytical possibilities arising from the disaggregation and the increase in population from the question "Do you consider yourself". We should underscore that, in previous censuses, the question skin color or ethnicity was part of the sample questionnaire, and the variables "Do you consider yourself Indigenous?" and location concerning Indigenous lands were not part of the censuses.

Work variables and type of households with Indigenous people

The variables considered in this study were gender, age, housing conditions, skin color or ethnicity, total number of residents in the household, and access to electricity, water, garbage collection, and bathroom in the household. The spatial dimensions analyzed were Brazil, Major Regions (North, Northeast, Southeast, South, or Midwest), situation (urban or rural), and location (inside or outside Indigenous land).

The skin color or ethnicity is that declared by the informant to the census taker[25] for the question "What is your skin color or ethnicity?", whose possible answers are "White", "Black", "Yellow", "Brown" and "Indigenous". The question "Do you consider yourself Indigenous?" was asked in the 2010 Census only within Indigenous lands when another skin color or ethnicity option was provided[25].

The condition in the household characterizes the "relationship between the household head [...] and each of the other residents"[18], in which the household head is "10 years of age or older, recognized by the residents as the household head"[24]. This variable was also adopted to characterize the kinship or cohabitation relationships between the residents in the analysis of the household composition of the types created. The variables related to services focus on the type of access to electricity and water in the home, the

disposal of sewage and residential waste, and the number of bathrooms in the home.

We paired the databases of people and households from the microdata to "reconstitute" the households and residents surveyed to classify individuals. Only households with at least one Indigenous declaration were considered. Each declared Indigenous person was then classified as living in one of the following types of households: (a) homogeneous, those in which all residents were declared Indigenous; (b) mixed with Indigenous head, those with residents who declared themselves Indigenous and also of other skin color or ethnicity options, and the household head was declared Indigenous; and; (c) mixed with non-Indigenous head, those with residents who declared themselves Indigenous and of other skin color or ethnicity options, and the household head was not declared Indigenous. The item "Do you consider yourself Indigenous?" was also used in the classification of the 2010 universe data to identify Indigenous people.

Expanded sample

The weighting area variable, usually recommended as a stratum for data expansion, was unavailable in the 1991 Census microdata. For this reason, the municipality variable was adopted as the stratum for the 1991 Census. The weighting area was used as the stratum for sample expansion[26] for the 2000 and 2010 Censuses. As expected, the 1991 results showed more significant variability than in 2000 and 2010. The breakdowns by federative units showed high variability, so we limited the aggregations to Brazil and Major Regions. The frequencies and respective ranges of all the variables in this article can be found in the doctoral thesis that originated them[2].

Ranking of access to basic sanitation and electricity services and infrastructure

Principal Component Analysis (PCA) was used to select and reduce variables and construct a summary indicator to measure Indigenous people's access to services and infrastructure. This resource is commonly used in studies on inequality that involve a large number of variables[27-29].

The PCA assisted in selecting, adapting, and reducing variables in this research. The variables initially observed were the total number of residents, the number of existing bathrooms, the sources of electricity and access to water used, and the destination of sewage and garbage from the households. These variables were adapted as follows: for each variable, the classification "yes" was assigned when the individual declared to be a resident of a household with the following characteristics: (a) with up to three residents; (b) with access to electricity supplied by an energy distribution company; (c) whose sewage disposal is the general sewage (or rainwater) network or septic tank; (d) with at least one bathroom, and; (e) whose water consumption comes from the general distribution network. Cases that did not meet these conditions were classified as "no". The "yes" cases for each variable were totaled for the application of the method. Thus, the model variables were the percentage of people (Indigenous and non-Indigenous) in households with up to three residents; the percentage of Indigenous people with access to electricity from an energy distribution company; the percentage of Indigenous people who live in households whose sewage disposal is the general network or septic tank; percentage of Indigenous people; percentage of Indigenous people whose household water supply is provided by a supply network; percentage of Indigenous people with garbage collected by a specialized service; and percentage of Indigenous people who live in households with at least one bathroom.

The explanatory power found for the first principal component of the PCA, that is, how much the model could explain total data variance, was 83.1% and aligns with other studies that also used this instrument to build inequality indicators[27-29]. Sixty values were generated (referring to 3x5x2x2 strata), given by the combination of the household type (three strata, namely, homogeneous, mixed with Indigenous head or mixed with non-Indigenous head), Greater Region (five strata, namely, North, Northeast, Southeast, South, or Midwest), situation (two strata, namely, urban or rural), and location (two strata, namely, inside or outside Indigenous land).

The values of each subgroup were sorted in descending order, where higher scores express more satisfactory access levels. The importance of using this data modeling resource lies in the possibility of measuring the inequality between different population groups, that is, from their relational perspective, instead of the very values obtained[27-29]. For microdata processing, we used the SAS Enterprise Guide 8.1 statistical package and, for multivariate statistical analyses, the FactoMiner library in the R Studio environment (version 3.6.3). The IBGE authorized our access to the universe's microdata, respecting all lim-

itations imposed by the Institute to preserve the statistical confidentiality of respondents[30]. The demographic census sample microdata are publicly accessible and can be consulted on the IBGE website.

Results

The total number of people who declared themselves as Indigenous, captured by the question on skin color or ethnicity in the 1991, 2000, and 2010 Censuses, in permanent and improvised private households, was 288,101, 718,310 and 818,632 individuals, respectively, encompassing 98% of the total number of Indigenous people listed in the 1991 and 2000 Censuses, and 91% of the total observed in the 2010 Census. These numbers were more significant in rural areas in the 1991 and 2010 Censuses, corresponding to 76% and 61% of the total Indigenous declarations. In the 2000 Census, more than half (53%) of the Indigenous population was in an urban context (Table 1).

Aggregation by type of households indicated distinct patterns for the total number of Indigenous people in homogeneous and mixed households. The number of Indigenous declarations in homogeneous households increased at the same rate of 1.7 in 1991/2000 and 2000/2010. Regarding Indigenous people in mixed households with Indigenous and non-Indigenous heads, there was a considerable increase in 1991/2000, followed by a decrease in the following period (2000/2010) at less pronounced levels.

The main difference observed between the 2000 and 2010 Censuses occurred in the urban context, including in absolute terms, with a declining number of Indigenous people from 380,877 to 320,334. The highest concentrations of Indigenous people were found in the following areas: in households in rural areas in which all residents were declared Indigenous (homogeneous), mainly in the North, Midwest, and Northeast; in mixed households in urban areas in the Southeast and Northeast; and homogeneous households located in urban areas in the North. The numbers of Indigenous people living in mixed households with an Indigenous and non-Indigenous head were not very pronounced in rural contexts in all regions and with similar relative frequencies.

Sociodemographic profiles in households with declared Indigenous people

Graph 1 shows the structure of Indigenous people by gender and age in 1991, 2000, and 2010 by household type. In homogeneous households, a young population can be observed compared to the country's general population, with a high proportion of children and young people. The age pyramids of this population indicate a continuous decrease in these younger groups and a progressive increase in the proportion of older age groups. No significant differences were found in the proportions of Indigenous men and women in homogeneous households. The estimated gender ratios were 108 men for every 100 women in the 1991 Census and 105 men for every 100 women in the 2000 and 2010 Censuses.

Mixed households had a lower proportion of Indigenous declarations for children and young people, suggesting a tendency for younger residents to declare other skin color or ethnicity options, mainly "White" and "Brown" and, in particular, in households whose household head was declared Indigenous.

This possibility is reinforced by the analysis of the household status variable, for which we found that most declarations for this item were people declared as head, spouse, sons, daughters, stepchildren, or stepdaughters of the head. The percentages of Indigenous people without a kinship relationship with the responsible person were residual for the three household types in all the aggregations analyzed and with high coefficients of variation.

In mixed households with an Indigenous head, most Indigenous people were identified as the head. In mixed households with a non-indigenous head, the Indigenous residents were mostly spouses, sons, daughters, stepchildren, or stepdaughters of the declared head. A higher proportion of Indigenous men than women was observed in households where the head was declared Indigenous; and a higher proportion of Indigenous women than men in households where the head was declared non-Indigenous.

The estimated gender ratios for Indigenous people in mixed households with an Indigenous head were 206, 163, and 117 men for every 100 Indigenous women and, for Indigenous people in mixed households with a non-Indigenous head, 47, 48, and 60 men for every 100 Indigenous women in the 1991, 2000 and 2010 Censuses, respectively.

Table 1. Total number of Indigenous declarations (N) and confidence interval (CI) in the 1991, 2000, and 2010 demographic censuses, by type of household with Indigenous people, Brazil and major regions,

Situation	Brazil and major regions	N	Homogeneous (N)	Confidence interval	Mixed with Indigenous household head (N)	Confidence interval	Mixed with Indigenous household head (N)	Confidence interval
				Censo 1991				
Total	Brasil	288,109	207,490	197115 - 217864	37,753	35865 - 39640	42,865	40722 - 45008
	Norte	119,905	100,302	95287 - 105317	9,843	9351 - 10335	9,759	9271 - 10247
	Nordeste	55,739	37,084	35230 - 38938	7,914	7518 - 8310	10,740	10203 - 11277
	Sudeste	30,250	7,189	6829 - 7548	10,476	9952 - 11000	12,585	11955 - 13214
	Sul	30,085	19,564	18586 - 20542	5,734	5447 - 6020	4,786	4547 - 5025
	Centro-Oeste	52,130	43,351	41183 - 45518	3,785	3595 - 3974	4,995	4744 - 5244
Urban	Brasil	70,369	18,896	17951 - 19841	22,914	21767 - 24059	28,559	27131 - 29987
	Norte	11,906	5,090	4835 - 5344	2,581	2452 - 2710	4,235	4023 - 4446
	Nordeste	15,925	4,862	4618 - 5105	4,628	4396 - 4859	6,435	6113 - 6757
	Sudeste	24,819	4,160	3951 - 4367	9,362	8893 - 9829	11,298	10732 - 11862
	Sul	9,984	2,469	2345 - 2592	4,117	3911 - 4323	3,397	3227 - 3567
	Centro-Oeste	7,735	2,316	2200 - 2431	2,225	2114 - 2336	3,194	3034 - 3353
Rural	Brasil	217,733	188,594	179164 - 198023	14,839	14097 - 15581	14,300	13584 - 15014
	Norte	107,987	95,212	90451 - 99972	7,257	6893 - 7619	5,518	5242 - 5794
	Nordeste	39,810	32,222	30611 - 33833	3,284	3120 - 3448	4,303	4088 - 4518
	Sudeste	5,433	3,029	2877 - 3180	1,117	1061 - 1172	1,287	1222 - 1350
	Sul	20,102	17,095	16240 - 17950	1,618	1537 - 1698	1,389	1319 - 1458
	Centro-Oeste	44,400	41,035	38982 - 43086	1,563	1484 - 1641	1,803	1712 - 1892
				Censo 2000				
Total	Brasil	718,305	349,731	332244 - 367217	195,458	185685 - 205230	173,116	164460 - 181771
	Norte	208,978	152,014	144413 - 159614	33,414	31742 - 35084	23,550	22372 - 24727
	Nordeste	169,294	62,854	59710 - 65996	55,108	52352 - 57863	51,333	48766 - 53899
	Sudeste	160,168	37,159	35301 - 39017	63,058	59904 - 66210	59,951	56952 - 62948
	Sul	84,184	37,129	35272 - 38985	26,091	24786 - 27395	20,964	19915 - 22012
	Centro-Oeste	95,680	60,575	57545 - 63603	17,787	16897 - 18676	17,318	16452 - 18184
Urban	Brasil	380,872	87,156	82797 - 91513	150,205	142695 - 157715	143,511	136335 - 150686
	Norte	46,118	15,450	14677 - 16222	15,108	14352 - 15863	15,560	14782 - 16338
	Nordeste	105,146	23,647	22464 - 24829	41,396	39326 - 43465	40,103	38097 - 42107
	Sudeste	139,714	26,518	25191 - 27843	57,870	54976 - 60763	55,327	52560 - 58093
	Sul	51,737	12,025	11423 - 12626	21,794	20704 - 22883	17,918	17022 - 18814
	Centro-Oeste	38,157	9,516	9040 - 9992	14,038	13336 - 14739	14,603	13872 - 15332
Rural	Brasil	337,433	262,575	249446 - 275703	45,248	42985 - 47510	29,610	28129 - 31090
	Norte	162,848	136,564	129736 - 143392	18,304	17388 - 19219	7,980	7580 - 8378
	Nordeste	64,157	39,206	37246 - 41166	13,717	13030 - 14402	11,234	10672 - 11795
	Sudeste	20,453	10,642	10109 - 11173	5,177	4917 - 5435	4,635	4402 - 4866
	Sul	32,451	25,104	23848 - 26359	4,300	4084 - 4514	3,047	2894 - 3199
	Centro-Oeste	57,524	51,058	48505 - 53611	3,751	3563 - 3938	2,715	2579 - 2850

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Table 1. Total number of Indigenous declarations (N) and confidence interval (CI) in the 1991, 2000, and 2010 demographic censuses, by type of household with Indigenous people. Brazil and major regions.

Situation	Brazil and major regions	N	Homogeneous (N)	Confidence interval	Mixed with Indigenous household head (N)	Confidence interval	Mixed with Indigenous household head (N)	Confidence interval
				Censo 2010				
Total	Brasil	818,632	591,688	562103 - 621272	130,674	124140 - 137208	96,269	91455 - 101082
	Norte	303,562	264,524	251297 - 277750	23,131	21974 - 24287	15,906	15111 - 16701
	Nordeste	209,125	131,311	124745 - 137876	43,560	41382 - 45738	34,254	32541 - 35967
	Sudeste	101,020	40,276	38261 - 42289	34,670	32936 - 36403	26,074	24769 - 27377
	Sul	74,977	49,515	47039 - 51990	15,603	14822 - 16382	9,859	9366 - 10352
	Centro-Oeste	129,948	106,063	100759 - 111365	13,710	13024 - 14395	10,175	9666 - 10684
Urban	Brasil	320,337	131,900	125305 - 138495	108,962	103513 - 114409	79,475	75500 - 83448
	Norte	60,711	34,517	32791 - 36242	15,735	14947 - 16521	10,459	9936 - 10982
	Nordeste	108,237	46,607	44276 - 48937	34,517	32790 - 36242	27,113	25757 - 28469
	Sudeste	81,925	24,709	23473 - 25944	32,623	30991 - 34253	24,594	23364 - 25823
	Sul	34,715	12,325	11708 - 12941	13,863	13169 - 14556	8,527	8100 - 8953
	Centro-Oeste	34,749	13,743	13056 - 14430	12,225	11613 - 12835	8,781	8342 - 9220
Rural	Brasil	498,308	459,788	436798 - 482777	21,726	20639 - 22812	16,795	15954 - 17634
	Norte	242,854	230,007	218506 - 241507	7,407	7036 - 7777	5,440	5167 - 5711
	Nordeste	100,896	84,704	80468 - 88939	9,049	8597 - 9501	7,143	6785 - 7499
	Sudeste	19,096	15,567	14788 - 16345	2,049	1946 - 2151	1,480	1405 - 1553
	Sul	40,258	37,190	35330 - 39049	1,735	1648 - 1821	1,333	1265 - 1399
	Centro-Oeste	95,204	92,319	87703 - 96935	1,485	1410 - 1559	1,399	1329 - 1469

Source: Microdata from the 1991, 2000 and 2010 census sample (IBGE).

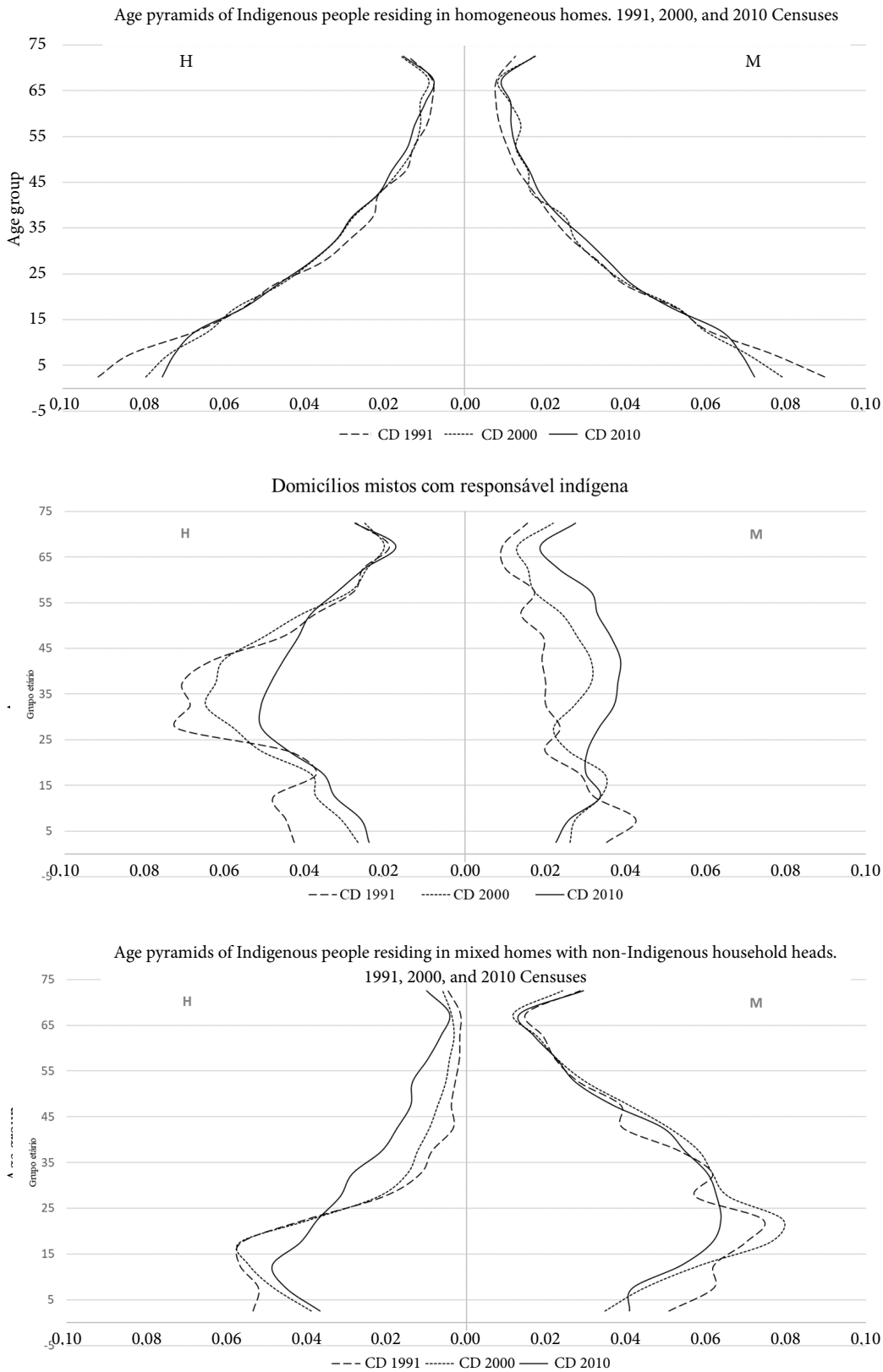
Mixed households: size and composition by skin color or ethnicity

Regarding mixed households, two points can be highlighted regarding size. The first concerns the concentration of Indigenous people in households with four or more residents, in which other statements of skin color or ethnicity are predominant. The second refers to the tendency for the number of residents per household to decrease, also observed in the national setting in recent decades[31].

According to the 1991 Census, 73% of mixed households with an Indigenous head and 82% of households with a non-Indigenous head had only one declared Indigenous resident, of which 45% lived in homes with four or more residents. In the 2000 Census, the percentages of mixed households with only one Indigenous declaration were 72% in households with an Indigenous head and 77% in households with a non-Indigenous head. As in the previous census, households with four or more residents were the most representative, as were those with two or three residents. In the 2010 Census, 72% of mixed households with an Indigenous head had a declared Indigenous person; in households with a non-Indigenous head, the percentage was 75%. A more balanced distribution was observed between household sizes, albeit with a concentration of 4 or more residents (Table 2).

Households with an Indigenous household head had a higher number of Indigenous declarations from adulthood onwards (25 years in 1991 and 2000 and 35 years in 2010), with a predominance of other color or race options for children and young people. In households where the household head was not Indigenous, non-Indigenous declarations were more frequent in all age groups in the three censuses analyzed[2].

The primary skin color or ethnicity options used were "Indigenous", "White", and "brown". In mixed households with an Indigenous head, the "Indigenous" option accounted for 36% of the to-



Graph 1. Age pyramids of Indigenous people declared in the 1991, 2000 and 2010 censuses, by type of residence, Brazil.

Source: Microdata from the 1991, 2000 and 2010 census sample (IBGE).

tal in the 1991 and 2000 Censuses and 39% in the 2010 Census. The second most used option was "Brown", with 35% in the 1991 Census and 29% in the 2000 and 2010 Censuses. The "White" option, in turn, represented 25%, 28%, and 25%, respectively, as the third most frequently used skin color or ethnicity option in these households. In households with a non-Indigenous household head, the most frequently declared skin color or ethnicity options were: 27% "Indigenous", 28% "White", and 40% "Brown" in the 1991 Census; 30% "Indigenous" and "White" and 32% "Brown" in the 2000 Census; and 34% "Indigenous", 31% "Brown", and 26% "White" in the 2010 Census.

Access to sanitation and electricity services

The largest contingents of Indigenous people listed in 2010 were concentrated in rural areas within Indigenous lands (55%) and in urban areas outside Indigenous lands (33%). Indigenous people living in rural areas outside Indigenous lands represented 9% of the total, of which 79% were concentrated in the North and Northeast regions of the country. Individuals living in households located within Indigenous lands, in urban areas, accounted for 3% of the total Indigenous declarations. The housing conditions observed in these geographic areas revealed significant differences between the population groups analyzed.

Indigenous people living on Indigenous lands in rural areas had the lowest levels of overall access to services. These individuals lived mainly in homogeneous households in the North, Midwest, and Northeast. Almost all of this population did not report access to garbage collection (95%), did not have a bathroom in their homes (73%), consumed water from wells, springs, or lakes (70%), and access to the sewage system or septic tank was restricted to less than 12% of the total.

Indigenous people in rural areas outside Indigenous lands had housing conditions similar to those within Indigenous lands. This population was particularly significant in the North and Northeast, which accounted for 79% of the total Indigenous population in this spatial section.

Regarding Indigenous people living on Indigenous lands in urban areas, the numbers were significant for people in homogeneous households in the Northeast, 74% of the total. The conditions were more favorable in this section since 71% of the individuals declared access to the sewage system or the presence of a septic tank; 87% had a bathroom in the home; 79% were served by

Table 2. Percentage of Indigenous declarations by skin color or ethnicity in mixed households, in urban situations, with Indigenous and non-Indigenous household heads, by number of residents in the household, in the 1991, 2000, and 2010 censuses, Brazil.

	Indigenous household head																	
nº indig.	**Census 1991**						**Census 2000**						**Census 2010**					
	nº residents (N = 207,871)						**nº residents (N = 1,071,216)**						**nº residents (N = 664,773)**					
	1	**2**	**3**	**4**	**5+**	**Total**	**1**	**2**	**3**	**4**	**5+**	**Total**	**1**	**2**	**3**	**4**	**5+**	**Total**
1	0.0	13.1	14.6	15.4	29.8	72.9	0.0	14.9	17.4	16.4	23.2	71.9	0.0	22.1	19.3	14.7	15.9	72.0
2	0.0	0.0	3.2	1.8	4.8	9.9	0.0	0.0	4.6	4.0	5.7	14.2	0.0	0.0	6.2	4.6	4.6	15.5
3	0.0	0.0	0.0	2.6	2.7	5.3	0.0	0.0	0.0	3.0	3.3	6.3	0.0	0.0	0.0	3.3	3.0	6.3
4	0.0	0.0	0.0	0.0	3.9	3.9	0.0	0.0	0.0	0.0	2.9	2.9	0.0	0.0	0.0	0.0	3.0	3.0
5+	0.0	0.0	0.0	0.0	8.0	8.0	0.0	0.0	0.0	0.0	4.7	4.7	0.0	0.0	0.0	0.0	3.2	3.2
						100.0						100.0						100.0
	Non-Indigenous household head																	
	Census 1991						**Census 2000**						**Census 2010**					
nº indig.	**nº residents (N = 317.590)**						**nº residents (N = 1.159.980)**						**nº residents (N = 563.607)**					
	1	**2**	**3**	**4**	**5+**	**Total**	**1**	**2**	**3**	**4**	**5+**	**Total**	**1**	**2**	**3**	**4**	**5+**	**Total**
1	0.0	10.7	12.4	14.7	44.1	81.8	0.0	11.7	15.5	17.9	32.4	77.4	0.0	16.0	17.8	17.6	23.7	75.0
2	0.0	0.0	2.1	1.8	4.6	8.5	0.0	0.0	2.9	3.9	6.7	13.4	0.0	0.0	4.8	4.4	5.1	14.3
3	0.0	0.0	0.0	1.6	2.5	4.0	0.0	0.0	0.0	1.8	2.9	4.7	0.0	0.0	0.0	2.9	2.6	5.4
4	0.0	0.0	0.0	0.0	2.0	2.0	0.0	0.0	0.0	0.0	2.4	2.4	0.0	0.0	0.0	0.0	2.8	2.8
5+	0.0	0.0	0.0	0.0	3.6	3.6	0.0	0.0	0.0	0.0	2.0	2.0	0.0	0.0	0.0	0.0	2.5	2.5
						100.0						100.0						100.0

Source: Microdata from the 1991, 2000 and 2010 census sample (IBGE).

garbage collection, the same percentage as those with access to the water supply network; and practically all of these individuals had access to the energy distribution network (98%).

Indigenous people living in urban areas outside Indigenous lands were more numerous in the Northeast (32%), Southeast (26%) and North (20%). The South and Midwest each accounted for 11% of the total. In this context, 61% of Indigenous people lived in mixed households, 36% lived where the household head was Indigenous, and 25% lived where the household head was not Indigenous. The conditions observed indicated almost total access to the electricity grid, more than 80% of individuals had a bathroom in the home, and household garbage collection service was declared by 88% of these people.

Generally, the proportions of access to the services analyzed in homogeneous households were lower than in mixed households. The most significant difference was found in access to the sewage system or the presence of a septic tank, namely, 53% of access by the subgroup classified as homogeneous versus 66% and 67% of those identified as mixed with Indigenous and non-Indigenous heads, respectively.

Table 3 shows the values generated for the summary indicator. The observed amplitude measures the inequality between the Indigenous subgroups in the spatial areas considered. The maximum value obtained was 6.2 times greater than the lowest estimated value relative to Indigenous people in homogeneous households in the North, rural areas, and within Indigenous lands.

In general, higher values were observed for urban areas than rural areas. Regionally, the highest values were for the Southeast, the South, Northeast, and Midwest, and the lowest for the North. In terms of location, Indigenous people living outside Indigenous lands presented higher values than those living inside Indigenous lands.

The results of the types analyzed in each geographic section indicated the inequality by skin color or ethnicity between the groups. In this sense, Indigenous people in mixed households with a non-Indigenous household head generally had higher values than those living in households with an Indigenous household head, and residents of homogeneous households had lower scores.

The analyses pointed to two distinct regional patterns, namely, the first, represented by the North and Midwest, is characterized by high Indigenous population contingents, mainly in rural situations, primarily within Indigenous lands, and lower scores; the second pattern predominates in the Southeast, South, and Northeast, with significant representation of individuals in urban situations, outside Indigenous lands, with higher scores, especially in the Southeast and South.

Discussion

The results of this research show the relevance of the proposed typology in characterizing the populations analyzed. We observed, among the types of households with Indigenous people, distinct profiles for each population subgroup, with differentiated and relatively consistent sociodemographic and spatial distribution patterns in the three censuses despite the fluctuations in the totals collected. The differences observed reflect, to a large extent, inequalities by situation and by Major Regions in agreement with those observed in the country[24], and regarding inequalities by skin color or ethnicity.

Several issues raised, such as the possible omission of declarations by Indigenous people, especially among children and young people, in mixed households located mainly in cities in the Northeast, Southeast, and North, may be further investigated as the complete results for Indigenous people from the 2022 Census are published. The first results for Indigenous people, published on August 7, 2023[17], provide clues to some possibilities.

In this census, marked by a significant increase in the capture of Indigenous populations, the question of considering oneself Indigenous accounted for more than a quarter of all declarations registered outside Indigenous lands, highlighting that, in 2010, this question was only used within Indigenous lands. This fact, on the one hand, reiterates the relevance of the coverage question, together with skin color or ethnicity, for capturing these populations; on the other hand, it points to the need to investigate this "new" population contingent captured, visible in the official statistics in this most recent census, as is the example of Manaus, in Amazonas, with 4,040 Indigenous people declared in the 2010 Census, and 71,713 in the 2022 Census, of which 52,860 captured by the question "Do you consider yourself Indigenous?"[17].

Also, from the perspective of the analytical-methodological possibilities opened by the 2022 Census, because the IBGE maintained the identification and ethnic-racial block questions

Table 3. Ranking of access conditions of Indigenous people declared in the 2010 Census to basic sanitation and electricity services and infrastructures by household type, greater region, situation, and location regarding Indigenous lands.

Nº	Experimental Unit	Value	Nº	Experimental Unit	Value
1	Hom-SE-U-Fora	4.78	31	Resp_Nao-SU-R-Fora	2.90
2	Resp_Ind-SE-U-Fora	4.70	32	Resp_Nao-SU-R-Dentro	2.87
3	Resp_Nao-SE-U-Fora	4.66	33	Resp_Nao-SE-R-Fora	2.81
4	Resp_Ind-SU-U-Fora	4.57	34	Hom-CO-U-Dentro	2.76
5	Resp_Nao-SU-U-Fora	4.56	35	Resp_Ind-SU-R-Dentro	2.56
6	Resp_Nao-SE-U-Dentro	4.51	36	Resp_Ind-CO-R-Fora	2.49
7	Resp_Ind-SE-U-Dentro	4.44	37	Resp_Nao-CO-R-Fora	2.48
8	Resp_Ind-SU-U-Dentro	4.40	38	Resp_Nao-SU-U-Dentro	2.38
9	Hom-SU-U-Fora	4.30	39	Hom-SE-R-Fora	2.36
10	Resp_Ind-CO-U-Fora	4.30	40	Resp_Ind-NO-U-Dentro	2.36
11	Resp_Nao-CO-U-Fora	4.26	41	Resp_Ind-NE-R-Fora	2.26
12	Resp_Ind-NE-U-Fora	4.24	42	Resp_Nao-NE-R-Fora	2.26
13	Resp_Nao-NE-U-Fora	4.24	43	Hom-SU-R-Dentro	2.23
14	Hom-CO-U-Fora	4.20	44	Hom-SE-R-Dentro	2.18
15	Hom-NE-U-Fora	4.19	45	Hom-SU-R-Fora	2.16
16	Hom-SE-U-Dentro	3.95	46	Resp_Ind-NE-R-Dentro	2.07
17	Resp_Nao-NE-U-Dentro	3.89	47	Hom-NE-R-Dentro	1.87
18	Resp_Nao-SE-R-Dentro	3.86	48	Resp_Nao-NE-R-Dentro	1.86
19	Resp_Ind-NE-U-Dentro	3.70	49	Hom-NE-R-Fora	1.82
20	Hom-NE-U-Dentro	3.67	50	Resp_Nao-CO-R-Dentro	1.74
21	Resp_Nao-NO-U-Fora	3.49	51	Resp_Ind-CO-R-Dentro	1.68
22	Resp_Nao-NO-U-Dentro	3.43	52	Resp_Ind-NO-R-Fora	1.43
23	Resp_Ind-NO-U-Fora	3.40	53	Hom-CO-R-Dentro	1.39
24	Resp_Nao-CO-U-Dentro	3.38	54	Resp_Nao-NO-R-Fora	1.30
25	Resp_Ind-CO-U-Dentro	3.20	55	Resp_Ind-NO-R-Dentro	1.26
26	Hom-SU-U-Dentro	3.15	56	Hom-CO-R-Fora	1.24
27	Resp_Ind-SU-R-Fora	3.03	57	Resp_Nao-NO-R-Dentro	1.19
28	Resp_Ind-SE-R-Fora	3.00	58	Hom-NO-U-Dentro	1.08
29	Resp_Ind-SE-R-Dentro	2.98	59	Hom-NO-R-Fora	0.84
30	Hom-NO-U-Fora	2.96	60	Hom-NO-R-Dentro	0.77

Types – Hom (homogeneous), Resp_Ind (mixed with indigenous person) and Resp_Nao (mixed with non-indigenous person); Large Region – NO (North), NE (Northeast), SE (Southeast), SU (South) and CO (Central-West); Situation – U (urban) and R (rural); location in relation to indigenous land – inside or outside.

Source: Microdata from the 1991, 2000 and 2010 census sample (IBGE).

in the universe questionnaire, keeping the location dimension, we will be able, for the first time, to compare the results of the universe of two censuses, expanding the possibilities of using the variables ethnicity and Indigenous language spoken at home.

The methodology used in this study allows the incorporation of these variables and others, such as those from the Indigenous approach questionnaire, another new feature of the 2022 Census, applied to political leaders of villages and communities before the start of the census, with questions about collective infrastructure, healthcare facilities, economy, and travel, among other topics, if this data is made public by the IBGE, obviously. The possibility of declaring more than one spouse within Indigenous lands and the existing kinship relationship for the composition of family units also represents another fertile ground for demographers of Indigenous themes and others interested in the topic.

However, the most significant novelty of the 2022 Census was the unprecedented investigation of quilombola populations. This new dataset also opens up possibilities for studies, including in its interface with Indigenous populations,

since dual quilombola and Indigenous belonging was possible, a relevant fact in specific locations, especially in some states in the Northeast.

The prospect of exploring the ethnic-racial identification criteria in conjunction with other questionnaire variables is a viable option for constructing new data arrangements that allow the investigation of specific population groups. However, it is essential to remember that these new analytical perspectives need to consider the limits of census data, including the suitability of the selected variables to the reality of Indigenous populations[1], the disaggregation's statistical robustness, and the impossibility of the demographic census to capture certain events with precision.

This last point was verified regarding the classification used in this study on the mortality block data from the 2010 Census, applied to households with an Indigenous declaration[32]. Although the results obtained suggest worse indicators for Indigenous people, some analyses based on indirect calculations (the surviving children and maternal orphanhood method) were inconclusive, probably due to the high omission of deaths among Indigenous people, highlighting that the omission of deaths in demographic censuses as a whole is recognized by experts[13,33] or is due to limitations of the data collected to estimate the indicators.

Classifying is, in essence, reducing and simplifying. However, despite this inevitable "flattening" of the realities captured in the research[6], its historical-political implications, and the limitations of the capture criteria themselves, the relevance of quantitative analyses on minority groups for the production and implementation of appropriate public policies and compliance with existing legal precepts is undeniable. In this sense, searching for new ways of analyzing data to portray better the characteristics of ethnically differentiated populations, such as Indigenous populations, is necessary to deepen knowledge about social and health inequalities, a fundamental dimension for implementing and monitoring public policies.

Collaborations

The co-authors of the text submitted to this journal were my advisor (RV Santos), an active participant throughout the research process, and my co-advisor (CN Carmo), who contributed knowledge and experience in multivariate modeling, including assistance with the computational codes necessary for the production of the analyses performed. In writing this article, I was responsible for producing the first text, which was remotely worked on and discussed by everyone until its final version.

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