Visualizing the invisible: the representation of reproductive labor in the 'Other forms of work' report from *PNAD Contínua*

Visualizando o invisível: a representação do trabalho reprodutivo no relatório "Outras formas de trabalho" da PNAD Contínua

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data visualization, reproductive labor, PNAD contínua

This article aims to analyze the data visualizations from the report "Other forms of work", developed by the *PNAD Contínua*, emphasizing how reproductive labor (Federici, 2019) is measured and represented in its findings. To this end, a framework was developed based on three axes: (1) Context and Representation; (2) Information Structure; and (3) Data Production. The analysis revealed that the visualizations presented do not convey a critical and argumentative narrative about the phenomenon. Therefore, a non-oppressive, inclusive, and feminist approach is essential in the creation, collection, organization, and dissemination of socially oriented data.

visualização de dados, trabalho reprodutivo, PNAD contínua

Este artigo tem como objetivo analisar as visualizações de dados do relatório "Outras formas de trabalho", elaborado pela PNAD Contínua, enfatizando a forma como o trabalho reprodutivo (Federici, 2019) é mensurado e representado em seus resultados. Para isso, desenvolveu-se um framework a partir de três eixos: (1) Contexto e Representação; (2) Estrutura da Informação; e (3) Produção de Dados. Assim, observou-se que as visualizações apresentadas não evidenciam uma narrativa crítica e argumentativa sobre o fenômeno. Portanto, é fundamental uma abordagem não opressora, inclusiva e feminista na elaboração, coleta, organização e divulgação de dados de cunho social.

1 Introduction

When we look up the word "*trabalho*" (work/labor) in the dictionary, we find various meanings, ranging from its syntactic function as a linguistic expression to its sense as a noun. Manual labor, for example, is defined as "a set of productive or intellectual activities carried out by man to generate utility and achieve a certain purpose" (Michaelis, n.d.). From a semantic standpoint, the phrasing suggests that such activities are performed by a man, implicitly excluding other possibilities. Furthermore, the term "full-time work" is described as "regular professional activity, paid or salaried" (Michaelis, n.d.), which may imply that there is no full-time work without remuneration.

However, in practice, this reality is quite different. Since the earliest times, women have been responsible for what Federici (1980; 2019) calls "*reproductive labor*" – an activity typically associated with the domestic sphere, which may or may not be paid. Often romanticized as acts of love and generosity, this labor leads women to relinquish their individual and financial freedom not only to bear children but also to care for them, feed them, clean, wash, and perform countless other accumulated tasks essential for maintaining the household and the family's survival.

If we consider that the foundation of society is life – or, under capitalist logic, that the system's functioning depends on human labor power – and that, therefore, people must be born, cared for, and prepared to join this productive force, we can conclude that it is impossible "to draw a line between the living individual and their labor power" (Federici, [2009]2019, p. 209). Yet reproductive labor remains invisible in statistics, relegated to the private sphere and sustained by a logic that absolves the State and the market of responsibility, shifting the burden of this work onto women.

Although the debate on reproductive labor has yet to gain significant traction in Brazil's public discourse, the issue is beginning to gain visibility through its indirect inclusion in national reports and surveys, such as those conducted by the *Pesquisa Nacional por Amostra de Domicílios Contínua* (*PNAD Contínua*/Continuous National Household Sample Survey) by the IBGE.[1] However, these statistics still have significant gaps, as they frame care work solely in terms of hours worked, without addressing its qualitative dimension, its intersections with other social factors, or the structural consequences of its undervaluation.

Thus, this article aimed to analyze the data visualizations from the "*Other forms of work*" report, produced by *PNAD Contínua* (2022), which includes data on the topic, as well as to examine the relationship between its methodologies and how reproductive labor is measured and represented in its findings. The study also highlights the relevance of the research, the credibility of the data, and its importance in seeking solutions to the problem of unpaid labor's invisibility – particularly that performed by women – and its influence on the country's socioeconomic dynamics.

1 Instituto Brasileiro de Geografia e Estatística/Brazilian Institute of Geography and Statistics. https://biblioteca.ibge.gov.br/index.php/biblioteca-catalogo?view=detalhes&id=2102020

2 Theoretical background

2.1 Gender and reproductive labor

The naturalization of domestic work as a female duty is directly tied to historically constructed gender hierarchies that devalue care-related tasks. As noted by Marçal (2017) money is one way to recognize and support people in their jobs and it is necessary to sustain social practices and daily life. Yet the global economy is precisely structured on gender exploitation, perpetuating the illusion that domestic and care work are not productive labor and thus unworthy of compensation.

Federici (2017) highlights how the establishment of a patriarchal order was essential to capitalism's development, as it imposed a sexual division of labor

that subjugated (unwaged) women to (waged) male labor. By exacerbating power imbalances between men and women, primitive accumulation was not merely economic but spawned broader expressions of inequality and social divisions. Thus, Federici ([2009] 2019) considers that the theorization of reproductive labor between the 1960s and 1970s showed how a specific model of family, sexuality and procreation are needed to produce a specific kind of worker that is prone to reproduce the capitalist mode of production.

Neoliberalism intensified this dynamic by reducing individuals to capital, valuing only activities that generate immediate economic returns. Market logic now governs all spheres of life, including care work – which, when not performed unpaid within households, is outsourced. Yet this outsourcing does not redistribute the burden equitably; instead, it shifts responsibility to women in more vulnerable conditions, reinforcing social and economic inequalities. As Federici ([2009] 2019) argues, "Neither the reorganization of reproductive labor on a market basis, nor the 'globalization of care,' nor even the technologization of reproductive labor has 'liberated women' or eliminated the exploitation inherent in reproductive work in its current form" (p. 225).

This process raises fundamental questions: Who cares for the nanny's daughter? Who cleans the cleaner's house? As Marçal (2017, p. 53) observes that if a woman enters a full-time job, she must assure a full-time domestic help. However, full-time reproductive work is only available to those women who can afford it. Furthermore, reproductive work cannot be easily replaced by automation as it is common in other kinds of work under capitalism, because as Federici ([2009] 2019) notes, it demands human interaction and fulfilling complex needs that are largely irreducible to mechanization. It also means that care work does not vanish – it merely changes hands, delegated to economically vulnerable women, often racialized and migrant. A precarious care network emerges, where the weight of this labor falls disproportionately on those with the fewest resources and opportunities.

Thus, Federici ([2009] 2019) concludes that reproductive labor must be valued as such, must be treated as a public matter and must not be a gendered issue. Otherwise, women shall have less power in confronting the State due to their conditions of social and economic vulnerability.

2.2 Data visualization

Despite the use of data carrying connotations of factual truth – appearing logical, precise, and objective, thus "uncontestable" – its neutrality is arbitrary and therefore constructed (Drucker, 2017). For instance, by questioning the very motivation behind a study's existence, we challenge its "objectivity." Furthermore, by problematizing the data collection process itself, sampling methods, and presentation formats, we arrive at divergent interpretations of the same phenomenon.

Haraway (1988) argues that the term "objectivity" is often associated with a masculine perspective, dominated by scientists and philosophers: "All Western cultural narratives about objectivity are allegories of the

ideologies governing the relations we call mind and body, distance and responsibility" (p. 583). Thus, objectivity is closely tied to "a view from above, from nowhere" (p. 589). In contrast, she proposes feminist objectivity, which "is about limited location and situated knowledge," enabling us to "become accountable for what we learn to see" (Haraway, 1988, p. 583). This practice of objectivity "privileges contestation, deconstruction, passionate construction, networked connections, and the hope for transforming systems of knowledge and ways of seeing" (p. 585).

As noted earlier, the data collection process itself often "supports the interests of people and institutions in positions of power" (D'Ignazio & Klein, 2020, p. 52). This manifests in multiple ways – from the choice of which data to collect to how it's interpreted and applied. In this context, Becker (2022) argues that in national censuses, for instance, the collection of accurate data in such a scale requires massive and costly labor and underreporting is consequently rampant. Even a simple question like "Where do you live?" presupposes an answer tied to a fixed location – a house, apartment, or similar structure.

> What does it mean to say someone 'lives' somewhere? There's no obvious answer, because most of us are in multiple places at different times. [...] Some wealthy individuals own two or more homes. Which one is 'where they live'? [...] How can or should we count the group we've come to call 'the homeless'? (Becker, 2022, pp. 151–152).

This reveals a fundamental problem inherent to data collection methodologies. Thus our conceptual frameworks are imbued with uncertainties and ambiguities that operate at unconscious levels and are generally disregarded. This requires, as Becker (2022) argues, highlighting even the most self-evident aspects – and especially those. It therefore becomes impossible to disentangle the complex interplay of social and material forces that shape the construction of data visualizations (D'Ignazio & Klein, 2015).

Drucker (2020) underscores that all graphical representations constitute rhetorical acts that do not merely "reveal" data in a supposed unadulterated state, but rather advance specific argumentative structures. As such, any visual format – however elementary it may seem – can be thought of as a graphic argument intentionally organized in a specific framework.

It is crucial to emphasize that "the normative standards, formulated by individuals belonging to socially dominant groups, presuppose that adopting certain biases – rationality, neutrality, universality, among others – leads to the ideal of good design" (Queiroz, 2021, p. 83). From this perspective, the sovereignty of rational thought is construed as both superior to and diametrically opposed to emotion (Queiroz, 2021).

Once we acknowledge that data visualizations are not neutral, we should proceed to understand what they – and the process through which they are made – reveal and enhance but also what they end up secluding, as Drucker (2021) argues. Consequently, to construct arguments and emphasize particular positions, visualizations may highlight certain datasets while

marginalizing or omitting others – whether through deliberate choice or the inherent limitations of graphic representation. For example, a bar chart advances a distinct epistemological claim compared to a pie chart, a distinction that is fundamental for the critical production of information visualizations (Drucker, 2021).

We thus recognize that every stage involved in producing data visualizations – from collection to final representation – constitutes acts of interpretation (Drucker, 2021). A different approach to data visualization is thus imperative. As Queiroz (2021) argues, rather than suggesting a full representation of the world, they should also account for and show uncertainty, external factors, missing data, and flawed methodologies that are inherent to any visualization.

In this context, database ethnography emerges as a viable approach, as it seeks to investigate how "databases reflect values, norms, epistemologies, and social relations that, in turn, shape how individuals interact with the world and with one another" (Burns & Wark, 2020, p. 5). Moreover, this methodological framework enables critical inquiry into the motivations and decisions that directly influence the entire database creation process. Database ethnography thus facilitates interrogation of the classificatory systems governing data, the epistemological frameworks that inform them, and their modes of representation and dissemination (Burns & Wark, 2020).

Database ethnography does not merely examine the database as an artifact, but rather investigates the full spectrum of sociotechnical processes that encompass its development and the broader implications of its existence. Within this analytical framework, ethnography aims to render visible the social processes embedded within databases – including their conceptual, technical, and social architectures – while simultaneously elucidating the social phenomena that emerge through the act of their creation (Burns & Wark, 2020). This approach allows researchers to identify the tacit knowledge possessed by those responsible for creating and managing databases, as well as to analyze ostensibly equivalent semantic categories that acquire divergent meanings across different contexts (Schuurman, 2008).

3 Research methodology

This article analyzes the 2022 *PNAD Contínua* report and datasets through the lens of the *Theoretical conceptual framework for reflexive approaches* (Table 1), developed as part of the reference model for egalitarian and non-oppressive information visualizations proposed by Burin, Fleury, and Ramos (2024).

Assuming the position that data cannot be neutral, the proposal aims to raise critical questions and serve as a guide for designers when dealing with data sampling. For this purpose, it is grounded in database ethnography, which seeks to investigate how "databases reflect values, norms, epistemologies and social relations that, in turn, influence how people interact with the world and with each other" (Burns & Wark, 2020, p. 5).

Table 1 Theoretical conceptual framework for reflexive approaches proposed by Burin, Fleury, and Ramos (2024), translated by the authors.

Critical concept	Domain of use	Propose	Reference
Contextualize infovis through additional resources, such as texts and supporting materials.	Visual encoding	"The text contextualizes data visualization, revealing the interpretation we are giving to the data and the ways in which we can use this information to promote change."	Bravo, Rufs, & Moyano (2022, p. 12)
Question the aesthetic and subjective origins that may be present in information visualization.	Visual encoding	"[...] it is necessary to decolonize the knowledge that regulates aesthetics and subjectivities controlled by hierarchies of power."	Bravo, Rufs, & Moyano (2022, p. 5)
Question: Whom are we representing? Whom are we not representing? How are we representing these people?	Reflection on data and visual encoding	"Whom are we representing? Whom are we not representing? How are we representing these people? These are crucial questions to raise awareness of invisible realities and begin to transform data visualization."	Bravo, Rufs, & Moyano (2022, p. 5)
Empathy yes, sensationalism no. Question the representation of data about impactful phenomena.	Visual encoding	"How can we achieve empathy without falling into sensationalism? Can we shock people and arouse emotions regarding an outrageous reality, while at the same time maintaining respect for the victims?"	Bravo, Rufs, & Moyano (2022, p. 9)
Rethink iconographies that oversimplify the complexity of information and reduce people's diversity.	Visual encoding	"The iconography used to identify men and women through a binary approach, which has become widespread in different spaces, reduces complexity and does not allow for a diverse range of people to be represented [...]"	Bravo, Rufs, & Moyano (2022, p. 9)
Consult people who will interact with the infovis or are represented therein when defining the terms that name categories.	Reflection on data and visual encoding	"It is not clear for whom a given dataset was created, how the (community's) understanding was defined for the group [...], among other qualities. The database can be interpreted as reflecting the creator's best efforts to provide the necessary information in relation to their conception of community."	Burns & Wark (2020, p. 12)
Question databases beyond the artifact, investigate dynamics that influence their characteristics and definitions.	Reflection on data	"Look not only at the dataset itself: but also at the practices of decision-making, deliberations, contexts, and political positions in which the database was constructed and in which it operates."	Bums & Wark (2020, p. 6)
Understand and question the classification system used.	Reflection on data and visual encoding	"It is once again apparent that when a system is established, it naturalizes itself as the 'way things are.'"	D'Ignazio & Klein (2020, p. 104)
Challenge binary thinking.	Reflection on data	"By challenging binary thinking that erases the experiences of certain groups while elevating others, we can work toward more just and equitable practices, and consequently, toward a fairer and more equitable future."	D'Ignazio & Klein (2020, p. 111)
Rethink conventions.	Visual encoding	"But they wanted to ensure that they did not reinforce gender stereotypes. They paid special attention to color. A design logic would favor cultural convention for interpretability, such as using pink for women and blue for men, but a feminist approach would use color choices to hack these same conventions."	D'Ignazio & Klein (2020, p. 112)

Table 1 Theoretical conceptual framework for reflexive approaches proposed by Burin, Fleury, and Ramos (2024), translated by the authors. (continued)

Critical concept	Domain of use	Propose	Reference
Visually represent data gaps to raise reflections and questions.	Visual encoding	"The absence of data becomes an important conclusion, as significant as the data themselves."	D'Ignazio & Klein (2020, p. 112)
Ask: are we considering the sociotechnical factors that structure the data we are using? Can we identify in the database the influence of decisions made during its construction?	Reflection on data	"Arc we guided by the data or by the stories these data allow us to tell? Are we oriented toward the data or toward the narrative logics from which these data emerge?"	Dourish & Gómez Cruz (2018, p. 6)

In addition to this framework, the research also referenced the analytical-methodological instrument proposed by Queiroz (2021), which compiled contributions from various authors on data visualization with the objective of proposing that data visualization "can also be a resource for emancipation. That is, for promoting a more just and egalitarian society, or at least for conveying information without so many biases perpetuated by dominant social groups" (p. 44).

To suit the objectives of this research, we developed our own framework[2] (Table 2) structured around three axes: (1) Context and Representation, (2) Information Structure, and (3) Data Production. Each of these axes encompasses specific aspects to be analyzed and critical questions that guided the conduct of the analysis.

In the first axis, **Context and representation**, we examine the report's visual and textual aspects, such as icons, images, colors, texts and graphs, as well as contextual elements like narrative and the representation of subjects, themes or objects. These elements are essential as they constitute the first layer of document interpretation and directly influence data understanding.

In the second axis, **Information structure**, the analysis focuses on data organization and presentation, considering how information is displayed and structured, which data are highlighted or omitted, whether there is a binary approach to categorization, and what gaps are created by these choices.

Finally, in the third axis, **Data production**, we conduct a contextual analysis of data collection and production, addressing questions such as who is producing this information, what its purposes and objectives are, what impacts may be generated, and how the collection method was structured. The goal is to understand whether biases are being reproduced in the process and to identify potential limitations in how the data were generated.

2 English and Portuguese versions for use: https://drive.google.com/drive/folders/1cK5zhQvjgfM_lF2Z2eTFr_Mx2SF1Fcew?usp=share_link

Table 2 Framework for critical analysis of data visualization.

	Aspects to be analyzed	Critical questioning
Context and representation	Texts	Does the text provide the necessary context to understand the visualization, its interpretation, and its potential impact?
	Colors, symbols, icons, images	Do the aesthetic and visual elements foster diversity and empathy, challenge conventions, and promote a more inclusive and less binary representation?
	Subject, object, theme	Does the visualization inclusively represent the subject, object, or central theme, considering who is being included or excluded from the narrative?
	Data representation	Do the chosen charts represent the information clearly, facilitating interpretation and highlighting numerical differences relevant to the narrative?
Informations structure	Structure	Do the presented information or data highlight the central aspects and structures of the issue, without sidelining relevant variables?
	Binarity	Do the presented data adopt a plural and inclusive approach, avoiding reductions to binary categories that might exclude or obscure certain groups?
	Gaps	Do the presented data reveal possible information gaps, encouraging reflection and raising relevant questions about what is missing?
Data production	Database contexts	Does the construction of the database take into account who is collecting the data, for what purpose it will be used, and how its structure impacts different groups?
	Objectives	Were the data collection and production guided by clear social and ethical objectives, challenging a purely economic approach based on value generation?
	Collection method	Does the data collection method consider the inclusion and accuracy of information, ensuring representativeness and avoiding biases that may render certain contexts, phenomena, or groups invisible?

4 Discussion

The project originated from extensive research on reproductive labor, through which it was observed that one of the most frequently cited sources in national studies was the "Other forms of work" report produced by the IBGE's *PNAD Contínua*, available for the years 2017, 2018, 2019, and 2022, with no edition conducted during the pandemic period. The survey encompasses "domestic chores within the household or relatives' households; care for individuals (children, elderly, ill, or people with special needs) within the household or for non-cohabiting relatives; production for self-consumption; and volunteer work" (IBGE, 2023, p. 1). Consequently, this study focused specifically on domestic chores and caregiving sections, as these constitute fundamental activities for the care economy.

4.1 Context and representation

Commencing the analytical process, whose first stage involved examining "context and representation," we note that the report makes minimal or no use of contextual information in its development, despite the understanding that "text contextualizes data visualization, revealing our interpretation of the data and ways we might use this information to drive change" (Bravo, Rufs, and Moyano, 2022, p. 12).

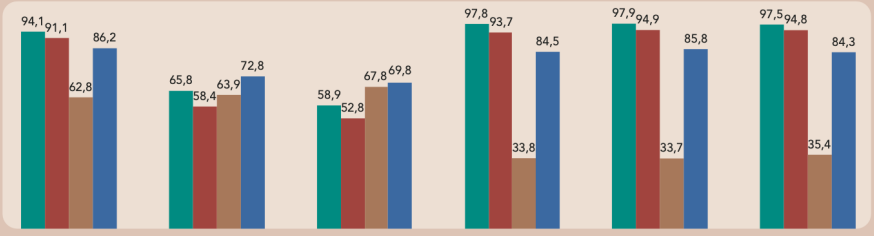
The textual content adopts an ostensibly objective tone, devoid of any framing or mention of systemic issues. Furthermore, it fails to address the configurations of this labor or its consequences for gender equity. Instead, it provides descriptions that translate the displayed charts, highlighting temporal trends and noting insights such as statistically significant percentage differences (Figure 1).

Em 2022, a atividade relacionada aos afazeres domésticos com o maior percentual de pessoas foi a ligada à alimentação, isto é, preparar ou servir alimentos, arrumar a mesa ou lavar louça (82,4%), seguida por cuidar da limpeza ou manutenção de roupas e sapatos (78,2%); limpar ou arrumar o domicílio, a garagem, o quintal ou o jardim (78,0%); e fazer compras ou pesquisar preços de bens para o domicílio (76,3%). A atividade com o menor percentual de pessoas, por sua vez, foi a de fazer pequenos reparos ou manutenção do domicílio, do automóvel, de eletrodomésticos ou outros equipamentos (45,2%), seguida de cuidar dos animais domésticos (50,8%). No período entre 2019 e 2022, as atividades que mais cresceram foram cuidar dos animais domésticos (3,3 p.p.); cuidar da limpeza ou manutenção de roupas e sapatos (2,8 p.p.); e fazer pequenos reparos ou manutenção do domicílio, do automóvel, de eletrodomésticos ou outros equipamentos (2,1 p.p.).

Quando se analisa, por sexo, o tipo de afazer doméstico, observam-se grandes diferenças entre homens e mulheres. Em 2022, as atividades ligadas à alimentação, limpeza ou manutenção de roupas e sapatos e limpeza ou arrumação do domicílio ainda estavam muito concentradas nas mulheres, enquanto a realização de pequenos reparos ou manutenção do domicílio foi a única atividade na qual os homens registraram percentual de realização maior que o das mulheres (60,2% dos homens que realizaram afazeres e 32,9% das mulheres).

A análise do tipo de afazer doméstico por condição no domicílio mostra que a sua realização pelos homens só se equipara à observada entre as mulheres quando o homem vive sozinho. Por outro lado, quando está em coabitação, seja na condição de responsável pelo domicílio, seja na condição de cônjuge ou companheiro, a realização de afazeres domésticos pelos homens se reduz sensivelmente em certas atividades, exceto quanto à realização de pequenos reparos ou manutenção do domicílio. Para as mulheres, contudo, não existem grandes diferenças na realização de certas atividades domésticas, conforme a sua condição no domicílio e o fato de viverem sozinhas ou em coabitação.

Pessoas que realizaram afazeres domésticos no domicílio, por tipo de afazer doméstico, segundo o sexo e a condição no domicílio (%)



Fonte: IBGE, Diretoria de Pesquisas, Coordenação de Pesquisas por Amostra de Domicílios, Pesquisa Nacional por Amostra de Domicílios Contínua 2022.
Nota: Pessoas de 14 anos ou mais de idade.

Figure 1 Example of text and graph from IBGE's *PNAD Contínua* (2023). The text reports some of the data and statistics regarding domestic affairs and, then, how it is divided by gender. The chart's title reads "People who realized household activities in their home, by kind of activity, according to gender and status in housing" and helps visualize such statistics.

An examination of the document's visual language reveals a predominance of verbal-visual communication formatted in two columns. Imagery is restricted to the cover's upper section, depicting exclusively women performing domestic tasks (Figure 2).

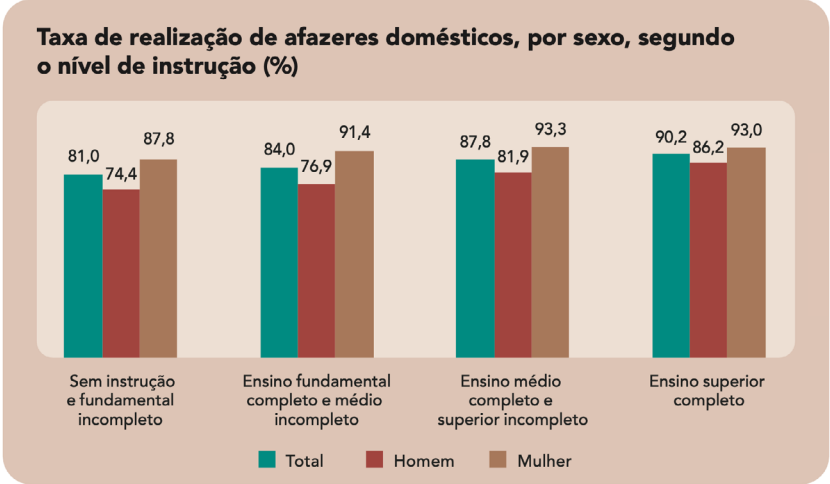
Figure 2 Cover image of IBGE's *PNAD Contínua* (2023). The title reads "Other forms of work 2022" and photographs show women performing domestic activities.

Pictogram usage remains scarce, employed only as supplementary elements adjacent to charts (Figure 3). These symbols reinforce binary representation paradigms, where feminine figures are identified through dresses and masculine figures through trousers.

Figure 3 Iconography used in IBGE's *PNAD Contínua* report (2023).

Once again, we observe attempts to maintain neutral appearances by avoiding direct image-data associations or explicit emotional engagement with the subject matter. However, the use of binary icons (such as skirted female figures and trousered male figures) perpetuates stereotypes and induces gender readings through normative visual markers, demonstrating how "neutral appearance" emerges from dominant cultural conventions. Consequently, iconography may prove exclusionary by oversimplifying representation and constraining the diversity of identities that could see themselves reflected in the presented data.

Additionally, the document employs color moderately, utilizing a consistent palette of beige, red, green, brown, and blue across all charts. Generally, green represents aggregate totals, red signifies male representation, and brown denotes female representation (Figure 4), except in time-series charts.



Fonte: IBGE, Diretoria de Pesquisas, Coordenação de Pesquisas por Amostra de Domicílios, Pesquisa Nacional por Amostra de Domicílios Contínua 2022.
Nota: Taxa de realização de afazeres domésticos é a proporção de pessoas de 14 anos ou mais de idade que realizaram afazeres domésticos no próprio domicílio ou em domicílio de parente, no total de pessoas de 14 anos ou mais de idade.

Figure 4 Example of color usage in graphs from IBGE's *PNAD Contínua* report (2023). The chart's title reads "Rate of household activities done by gender, according to level of education (%)". The green bars depict the rates by gender: green relate to total, red to men and brown to women.

While avoiding conventional pink/blue gender coding, this chromatic selection warrants scrutiny since green and red frequently connote positive/negative valuations, potentially influencing data interpretation. Moreover, extreme contrast between these hues may impair readability, compromising visual clarity and categorical differentiation. Thus, the color scheme neither effectively highlights particular data points nor represents meaningful progress in challenging gender norms.

Regarding visualization choices, the report employs only three chart types (bar charts, tables, and maps), inadequately prioritizing data legibility. For instance, metrics on caregiving hours are presented in tabular format (Figure 5), as are other percentage-based data that could benefit from more impactful visual representations.

This approach risks compromising data visibility and interpretation, as the selected formats neither clearly convey the substantive impact of information nor effectively emphasize numerical disparities between analyzed groups.

Concluding our context and representation analysis, Bravo, Rufs, and Moyano (2022, p. 5) emphasize the imperative to interrogate: "Who are we representing? Who are we not representing? Or how are we representing these individuals?" to recognize invisible realities and visualize frequently omitted and marginalized populations.

In this regard, the report includes only racial, age-based, and regional breakdowns, omitting specific data about LGBTQIAPN+ individuals, people with disabilities, or other historically underrepresented groups such as Indigenous and Quilombola communities. These absences constrain understanding of intersectional inequalities and limit capacity to formulate more inclusive, representative policies.

Pessoas que realizaram afazeres domésticos no domicílio, por sexo, segundo o tipo de afazer doméstico (%)

Tipo	Total	Homem	Mulher
Preparar ou servir alimentos, arrumar a mesa ou lavar louça	82,4	66,0	95,7
Cuidar da limpeza ou manutenção de roupas e sapatos	78,2	60,8	92,3
Fazer pequenos reparos ou manutenção do domicílio, do automóvel, de eletrodomésticos ou outros equipamentos	45,2	60,2	32,9
Limpar ou arrumar o domicílio, a garagem, o quintal ou o jardim	78,0	72,4	82,6
Cuidar da organização do domicílio (pagar contas, contratar serviços, orientar empregados etc.)	73,7	72,0	75,1
Fazer compras ou pesquisar preços de bens para o domicílio	76,3	73,6	78,4
Cuidar dos animais domésticos	50,8	47,9	53,2

Fonte: IBGE, Diretoria de Pesquisas, Coordenação de Pesquisas por Amostra de Domicílios, Pesquisa Nacional por Amostra de Domicílios Contínua 2022.
Nota: Pessoas de 14 anos ou mais de idade.

Figure 5 Example table from IBGE's *PNAD Contínua* report (2023). The table's title reads "People who realized household activities in their home, by gender, according to kind of activity" and the columns headers read, from left to right: Kind; Total; Men; Women. Each line corresponds to one kind of activity.

4.2 Information structure

In analyzing the "Information Structure" stage, we observe that the report's data organization is predominantly percentage-based, emphasizing gender through the categories "woman," "man," and "total." This model suggests an intention to highlight gender disparities. However, by presenting data this way, the analysis ultimately marginalizes other relevant variables such as age, income, race/ethnicity, and education level. Consequently, it fails to fully explore how these factors interact and influence the distribution of care work and domestic chores.

This approach reinforces a binary perspective on gender without considering its fluidity and complexity (cf. Butler, 2018). As D'Ignazio & Klein (2016, p. 2) argue, "a feminist approach to data visualization should emphasize representation strategies based on multiplicity rather than binaries, and recognize the limitations of any dichotomous perspective." The report's lack of such multiplicity constrains understanding of intersectional dynamics, limiting the visualization's capacity to comprehensively represent the social dimensions of care work.

This binarism is further reinforced by the absence of intersectional data, which restricts analytical depth and creates gaps in findings. Although the report includes some demographic breakdowns, cross-referencing these variables could reveal additional realities and expand discussion beyond the paid/unpaid labor dichotomy.

Crucial aspects like low wages and the devaluation of care professionals (including cleaners, domestic workers, and nurses) remain underexplored. Moreover, the report does not directly address these activities' physical/mental health impacts or the labor market barriers faced by those performing such work, whether paid or unpaid.

4.3 Data production

Beginning the "data production" analysis stage, it is essential to contextualize that its framework follows guidelines established by the 19th International Conference of Labour Statisticians (ICLS), convened by the International Labour Organization (ILO) in 2013. While the report mentions domestic chores and caregiving, the inclusion of volunteer work and production for self-consumption categories stems from the understanding that these "are also considered work, even if unpriced or excluded from Gross Domestic Product (GDP) calculations" (PNAD, 2022, p. 1).

The ILO's framework for "other forms of work" aimed to establish standardized parameters and clear categorization of labor. Its primary purpose is enabling precise data collection, as stated on their website: "A key objective of labor market monitoring is assessing how fully economies utilize available human resources – in other words, the extent to which they provide employment opportunities matching population potential" (ILO, n.d.).

3 https://ilostat.ilo.org/methods/concepts-and-definitions/forms-of-work/

This established, we must critically examine the market-driven ideologies underlying research that often prioritizes profit optimization. As D'Ignazio & Klein (2020) cited in Bravo, Rufs, and Moyano (2022, p.4) note, "Data is being mainly produced for economic interest, and from their acritical social paradigms and biases: under a punitive society where data is used for control; a sexist society without adequate representation of gender and territories."

Beyond these issues, examining the data collection questionnaire (Figure 6) reveals simplistic language and predominantly yes/no question formats. However, this model collapses diverse contexts into single responses, potentially yielding less meaningful data due to interpretive variability.

Another relevant aspect is how data collection addresses the frequency and time expenditure on these activities – an essential element for quantifying labor input. However, the questionnaire solicits this information through an open-ended question about weekly hours dedicated to domestic and care work, without providing reference points or criteria to aid estimation. This raises a critical question: how does one accurately calculate total time spent on diverse activities like laundry, cooking, pet care, and other daily tasks? The absence of standardized methodology may compromise data accuracy, rendering responses highly subjective.

Consequently, while the PNAD report acknowledges care work's existence, it may simultaneously reproduce biases that perpetuate its invisibilization. The lack of contextual information about this labor's complexity and intersectional dimensions reflects a data collection model prioritizing traditional economic metrics, failing to capture these tasks' social significance and role in organizing life and economy. Applying our framework to this analysis yielded the following systematization (Table 3).

AFAZERES DOMÉSTICOS

120. **(SE ENTREVISTA = 5)** Na semana de___a___ (semana de referência), ___fez tarefas domésticas para o próprio domicílio, tais como: **V4120**

1. Preparar ou servir alimentos, arrumar a mesa ou lavar as louças? **V41201**	1. ☐ Sim	2. ☐ Não
2. Cuidar da limpeza ou manutenção de roupas e sapatos? **V41202**	1. ☐ Sim	2. ☐ Não
3. Fazer pequenos reparos ou manutenção do domicílio, do automóvel, de eletrodomésticos ou outros equipamentos? **V41203**	1. ☐ Sim	2. ☐ Não
4. Limpar ou arrumar o domicílio, a garagem, o quintal ou o jardim? **V41204**	1. ☐ Sim	2. ☐ Não
5. Cuidar da organização do domicílio (pagar contas, contratar serviços, orientar empregados etc.)? **V41205**	1. ☐ Sim	2. ☐ Não
6. Fazer compras ou pesquisar preços de bens para o domicílio? **V41206**	1. ☐ Sim	2. ☐ Não
7. Cuidar dos animais domésticos? **V41207**	1. ☐ Sim	2. ☐ Não
8. Outras tarefas domésticas? **V41208** especifique_____	1. ☐ Sim	2. ☐ Não

Siga 121a.

121a. **(SE ENTREVISTA = 5)** Na semana de___a___ (semana de referência), ___fez alguma tarefa doméstica em domicílio de parente? **V4121A**

1. ☐ Sim 2. ☐ Não

Se 121a = Sim ou 117a.1 = Sim ou 117a.2 = Sim ou 117a.3 = Sim ou 117a.4 = Sim ou 117a.5 = Sim ou 117a.6 = Sim ou 119 = Sim ou 120.1 = Sim ou 120.2 = Sim ou 120.3 = Sim ou 120.4 = Sim ou 120.5 = Sim ou 120.6 = Sim ou 120.7 = Sim ou 120.8 = Sim, siga 121b.
Caso contrário, encerre a parte.

121b. **(SE ENTREVISTA = 5)** Na semana de___a___ (semana de referência), ___ qual foi o total de horas que dedicou às atividades de cuidados de pessoas e/ou afazeres domésticos?

☐☐ h **V4121B**

Obs1: Contar apenas uma vez o tempo em horas dedicado simultaneamente a mais de uma atividade.

Encerre a parte.

Outras formas de trabalho – 2016-ATUAL **Pesquisa Nacional por Amostra de Domicílios Contínua**

Figure 6 Questionnaire used for data collection in IBGE's *PNAD Contínua* report. This questionnaire addresses household activities, asking if the respondent had done any of the following in a given week, only with yes/no alternatives to answers.

Table 3 Completed framework for critical analysis of data visualization.

	Aspects to be analyzed	Critical questioning	
Context and representation	Texts	Does the text provide the necessary context to understand the visualization, its interpretation, and its potential impact?	
	Colors, symbols, icons, images	Do the aesthetic and visual elements foster diversity and empathy, challenge conventions, and promote a more inclusive and less binary representation?	
	Subject, object, theme	Does the visualization inclusively represent the subject, object, or central theme, considering who is being included or excluded from the narrative?	
	Data representation	Do the chosen charts represent the information clearly, facilitating interpretation and highlighting numerical differences relevant to the narrative?	
Informations structure	Structure	Do the presented information or data highlight the central aspects and structures of the issue, without sidelining relevant variables?	
	Binarity	Do the presented data adopt a plural and inclusive approach, avoiding reductions to binary categories that might exclude or obscure certain groups?	
	Gaps	Do the presented data reveal possible information gaps, encouraging reflection and raising relevant questions about what is missing?	
Data production	Database contexts	Does the construction of the database take into account who is collecting the data, for what purpose it will be used, and how its structure impacts different groups?	
	Objectives	Were the data collection and production guided by clear social and ethical objectives, challenging a purely economic approach based on value generation?	
	Collection method	Does the data collection method consider the inclusion and accuracy of information, ensuring representativeness and avoiding biases that may render certain contexts, phenomena, or groups invisible?	

Legend: Yes, fully; Yes, with reservations; Does not meet; Not applicable.

5 Conclusion

This study's analysis underscores the necessity of non-oppressive, inclusive, and feminist approaches in designing, collecting, organizing, and disseminating social data. Notably, the absence of data cross-referencing and intersectionality substantially impacts problem comprehension and phenomenon visibility. Unlike the aggregated data in IBGE's repository, the report should not merely provide numerical insights but help expose the issue's complexity. However, it presents percentage differences that raise concerns about data treatment when compared to ILO results – which utilizes IBGE microdata but processes, cross-references, and reinterprets findings through more critical international lenses.

Similarly, the report's visualizations fail to establish reader engagement or present argumentative narratives about the issue. A potential solution would involve graphically highlighting insights mentioned in the text, since while databases provide raw data, reports should facilitate contextual understanding.

Furthermore, the absence of a widely disseminated national report systematically addressing reproductive labor constitutes a significant barrier to advancing this debate. Statistics don't merely document realities but serve as policymaking and strategic decision-making tools. When data communication neglects complexity, omissions, and limitations, it loses transformative potential and social impact capacity.

Thus, our proposed framework emerges as an analytical tool for critically assessing data visualizations, identifying methodological limitations, biases, and omissions that may compromise social phenomenon interpretation. Beyond merely "presenting" numbers, reports must communicate contextualized argumentative narratives that enhance problem comprehension while maintaining clear epistemological positioning.

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