Sociedade Brasileira de Educação Matemática

RIPEM

Interpretation of infographic by students in the 3rd and 5th grades of Primary School from the perspective of Statistical Literacy: the bullying in schools

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2238-0345 ISSN

10.37001/ripem.v14i3.3755 doi

Received • 26/01/2024
Approved • 14/05/2024
Published • 20/08/2024

Editor • Gilberto Januario

Abstract: In this study we seek to investigate how students in the 3rd and 5th grade of primary School interpret a statistical infographic about bullying in schools, considering the elements of Statistical Literacy mobilized by them. A diagnosis was developed involving questions of interpretation of an infographic about *bullying*, from a textbook, in 3rd and 5th grade classes. The results showed that the majority of students were able to interpret the graphics and textual information, with 5th grade students performing better. However, students were unaware of what a data source was and its importance, which was understood after the training process, allowing students to make judgments regarding its reliability. Furthermore, they made effective decisions regarding bullying in schools. We concluded that students were able to interpret the infographic and make effective decisions, mobilizing cognitive and dispositional elements of Statistical Literacy.

Keywords: Statistical Literacy. Statistical Education. Infographic. Elementary School.

Interpretación de la infografía por parte de estudiantes de 3º y 5º de Educación Primaria desde la perspectiva de lo Letramento Estadístico: bullying en las escuelas

Resumen: En este estudio buscamos investigar cómo los estudiantes de 3º y 5º año de Educación Primaria interpretan una infografía estadística sobre el acoso escolar, considerando los elementos de Letramento Estadístico movilizados por ellos. Se desarrolló un diagnóstico que involucró preguntas de interpretación de una infografía sobre *bullying*, de un libro de texto, en clases de 3º y 5º año. Los resultados mostraron que la mayoría de los estudiantes fueron capaces de interpretar los gráficos y la información textual, teniendo mejores resultados los estudiantes de 5º año. Sin embargo, los estudiantes desconocían qué era una fuente de datos y su importancia, lo que fue comprendido después del proceso de capacitación, lo que permitió a los estudiantes emitir juicios sobre su confiabilidad. Además, tomaron decisiones efectivas respecto al acoso escolar. Concluimos que los estudiantes fueron capaces de interpretar la infografía y tomar decisiones efectivas, movilizando elementos cognitivos y disposicionales de lo Letramento Estadístico.

Palabras clave: Letramento Estadístico. Educación Estadística. Infografía. Primeros Años. Enseñanza Fundamental.

Interpretação de infográfico por estudantes de 3º e 5º anos do Ensino Fundamental na perspectiva do Letramento Estatístico: o bullying nas

escolas

Resumo: Neste estudo buscamos investigar como estudantes do 3º e 5º ano do Ensino Fundamental interpretam um infográfico estatístico sobre o bullying nas escolas, considerando os elementos do Letramento Estatístico mobilizados por eles. Foi desenvolvida uma diagnose envolvendo questões de interpretação de um infográfico sobre o *bullying*, de um livro didático, em turmas do 3º e do 5º ano. Os resultados apontaram que a maioria dos estudantes conseguiu interpretar os gráficos e as informações textuais, tendo um melhor desempenho os estudantes do 5º ano. Entretanto, os estudantes desconheciam o que era uma fonte dos dados e sua importância o que foi compreendido após o processo formativo, permitindo os estudantes a realizarem julgamentos a respeito da sua confiabilidade. Além disso, tomaram decisões efetivas a respeito do bullying nas escolas. Concluímos que os estudantes foram capazes de interpretar o infográfico e tomar decisões efetivas, mobilizando elementos cognitivos e disposicionais do Letramento Estatístico.

Palavras-chave: Letramento Estatístico. Educação Estatística. Infográfico. Anos Iniciais. Ensino Fundamental.

1 Introduction

In an increasingly data-saturated world, the ability to interpret statistical information becomes an essential tool for promoting Statistical Literacy, namely critical thinking and individuals' capacity to discern between true and false information. In this way, the importance of interpreting statistical information transcends disciplines, enabling us to better understand the complexity of our environment and make informed decisions amidst a multitude of data.

The National Common Curricular Base — BNCC (Brazil, 2018), the main Brazilian curriculum guideline in force, not only specifies the content to be addressed but also highlights the competencies and skills that students should acquire in relation to each area of education. This document addresses the teaching and learning of Statistics, in the thematic unit of Statistics and Probability, and indicates for Elementary Education the need to approach concepts, phenomena, and procedures present in everyday problem situations, sciences, and technology. It emphasizes that "all citizens need to develop skills to collect, organize, represent, interpret, and analyze data in a variety of contexts, in order to make well-founded judgments and decisions" (Brazil, 2018, p. 274). In this sense, this document reinforces the importance of Statistical Literacy in the civic education of students.

Furthermore, this document also argues that current language practices are increasingly focused on *multimodal* genres, i.e., those composed of various modes and combining verbal and visual language, as in the case of infographics, highlighting the importance of developing in students the ability to critically interpret these genres disseminated by the media.

Statistical Literacy, as understood by Gal (2002) as the ability to interpret and use statistical information critically and reflectively, plays a crucial role in the formation of statistically literate citizens. Sharing this conviction, we advocate for examining how children interpret, draw conclusions, and make decisions based on statistical information, taking into account cognitive and dispositional aspects related to Statistical Literacy. In addition to these reflections, it is also necessary to provide situations involving the interpretation of data familiar to individuals and evaluate them, allowing them to reflect on them and consider the beliefs that possibly influence their analyses, often overriding real research data. In this context, the present study aims to investigate how 3rd and 5th-grade students interpret a statistical infographic on bullying in schools and the elements of Statistical Literacy mobilized by them.

Previous studies with infographics in the early years, in the areas of Language and also Statistics, highlight that interventions with infographics allow students to develop the ability to relate information to their personal knowledge, draw conclusions, and make judgments, as well as express reactions on the subject through critical reading (Curasma, Ore & Álvarez, 2020; Quejada, 2022); and that diagnoses with statistical infographics have indicated that early years students possess skills to interpret, evaluate, and formulate conclusions based on the data present in these genres, as well as to make effective decisions to solve social problems (Diniz, 2021, 2022; Diniz & Guimarães, 2022). However, the objective of these studies was not to discuss how students view the data source, how they critically question the reliability of this source, and whether their world knowledge and beliefs outweigh real research data, but it is an objective of ours, which we will discuss in the present study.

Thus, given the scarcity of research involving the understanding of early years Elementary School students about statistical infographics, this research is situated. In this way, we aim to elucidate what knowledge is mobilized by students to interpret and critically evaluate data in statistical infographics? In this sense, we aim to investigate how 3rd and 5th-grade students interpret a statistical infographic on bullying, considering the elements of Statistical Literacy mobilized by them.

2 Statistics in the Early Years of Elementary School

In 2002, Iddo Gal conceptualized Statistical Literacy as the ability to understand, interpret, communicate, and critically approach statistical data, empowering individuals to make effective decisions and evaluate information critically in quantitative contexts. According to Gal, being statistically literate implies the ability to understand and communicate statistical information, as well as the skill to use statistical tools to solve problems and make decisions.

Gal (2002) highlights the existence of two fundamental components associated with statistical competence: cognitive and dispositional elements. Cognitive elements encompass the knowledge and skills necessary to analyze and evaluate statistical information in various contexts. Dispositional elements refer to individuals' ability to reflect, opine, and react critically to this information, understanding its significance, forming opinions about it, and reflecting on its acceptance or refusal.

According to Gal, interpreting information and statistical data is a fundamental task for data consumers, as well as critically reflecting on them and making decisions. For this, it is necessary for citizens to experience reading contexts involving different media, both printed and digital, in which statistical information can be presented through text (written or oral), numbers, and symbols, as well as through graphical or tabular presentations, often in an articulated manner. The infographic, as a genre that articulates between different visual and textual elements, allows for the experience of these reading contexts and requires different skills and knowledge of Statistical Literacy to read and understand its information.

Recognizing that comprehension and decision-making skills demand competencies involving the interpretation of data presented in graphs, both the National Common Curricular Base - BNCC (Brazil, 2018) and the Curriculum of Pernambuco (Pernambuco, 2019) consider these abilities essential for teaching Statistics from the early years of Elementary Education.

These documents emphasize the relevance of Statistical Literacy in the student's civic education process through an educational approach focused on developing skills related to data collection and presentation. Additionally, they highlight the importance of developing interpretation, evaluation, and decision-making competencies regarding statistical information, aiming to create more critical and well-informed citizens in the face of messages conveyed by

the media. Furthermore, they recognize that activities involving the analysis and interpretation of graphs and texts with statistical information provide students with the opportunity to develop fundamental skills to discern aspects that allow them to trust or question the data.

In this context, several researchers have explored how students in the early years of Elementary Education understand different types of graphs. They examine the facilitations and challenges faced by children while suggesting interventions aimed at developing statistical literacy skills.

The outcomes of these studies indicate that students in the early years of Elementary Education demonstrate an aptitude for interpreting bar graphs, identifying explicitly represented values, and understanding unitary scales. However, they face challenges when interpreting line graphs, identifying implicitly expressed values, and dealing with non-unitary scales. Nevertheless, when subjected to systematic teaching methods, these students demonstrate the ability to interpret various types of graphs (such as bar, pie, pictorial, and line graphs), locate explicit and implicit values in unitary or non-unitary scales, formulate hypotheses and confront them with real data, as well as draw conclusions and make decisions based on information presented in tables and graphs.

However, we need to understand what an infographic is, what national curricular documents specifically point out about working with this textual genre in early Elementary Education classes, as well as what previous studies indicate about the use of infographics in the early years.

3 Infographics in the Early Years of Elementary School

The Infographics are a form of visual representation of information that combines images, words, and symbols, using verbal and visual elements (text, graphs, tables, maps, images), offering greater communication efficacy. It is worth noting that it is not only about transforming text into graphics but also about choosing and highlighting the most important information, using appropriate visual elements, and organizing the data in a way that allows the reader to understand the information (Rajamanickam, 2005).

Infographics are a textual genre whose communicative function is to provide information on various areas of knowledge. It presents information in a non-linear way, but in some cases, it demonstrates linearity in its organization, grouped in small blocks that have complete meaning and form a significant whole. Although composed of different verbal and visual elements, infographics are a textual genre because they have a well-defined structure, a purpose, formal marks, and meaning in themselves (Sojo, 2002).

The media have widely employed the infographic genre to disseminate information. Given this scenario and recognizing its contributions and potential for teaching and learning, the BNCC (Brazil, 2018), and the 2019 Pernambuco Curriculum emphasize the importance of addressing the reading and comprehension of infographics from the early years of Elementary Education, specifically in the Language area. However, they emphasize the need for a gradual approach in working with the genre, starting with guided and shared reading, evolving into a more autonomous approach.

Both documents recognize that infographics play a significant role in research, highlighting the importance of developing students' ability to recognize the functions of graphs and tables, as well as the ability to compare data through this genre. However, this emphasis is not explicitly mentioned in the Mathematics - Probability and Statistics area, which is considered a shortcoming, as many infographics present statistical data and require Statistical

Literacy knowledge and skills to be interpreted (Diniz, 2022).

Recent studies with infographics in the early years, in the Language area, have pointed out that after interventions with infographics, students were able to relate the information to their personal knowledge, reconstruct its meaning, draw conclusions, distinguish between fact and opinion, and express reactions on the subject. In other words, working with infographics allows the development of critical reading skills in children (Curasma, Ore & Álvarez, 2020; Quejada, 2022).

In the field of Statistics, diagnostic studies have indicated that students in the early years demonstrate skills to interpret statistical infographics, as well as critical ability in evaluating and formulating conclusions from the data presented in these genres, resulting in effective decisions to solve social problems such as food waste and garbage production. However, it is observed that younger students require more mediation to understand the inherent relationships in graph reading and to assimilate mathematical concepts often involved even in those intended for a very young audience. On the other hand, older students can perform these tasks more autonomously. They also highlight that understanding the statistical messages present in infographics involves the mobilization of cognitive and dispositional elements related to Statistical Literacy (Diniz, 2021, 2022; Diniz & Guimarães, 2022).

Although we find infographics on different media, they are still not widely used in textbooks. Based on the analyses conducted by Grymuza and Guimarães (2021) of the Statistics activities proposed in Mathematics textbooks for the 1st and 5th grades of collections approved by PNLD 2019, we identified, among all statistical graphs present in all analyzed books, only one infographic. We highlight that this scarcity of infographics in Mathematics textbooks may be related to the fact that this genre is not pointed out by the BNCC (Brazil, 2018) in the Mathematics — Probability and Statistics area, as this document serves as a guide not only for teachers but also in the development of content present in textbooks developed in the country. Despite this, we know that there are many statistical infographics that could be disseminated in Mathematics textbooks and activities could be proposed from them, providing students with the opportunity to develop Statistical Literacy skills and knowledge, aiding in their civic education.

Thus, this study aimed to investigate how 3rd and 5th-grade students interpret a statistical infographic considering the elements of Statistical Literacy mobilized by them.

4 Method

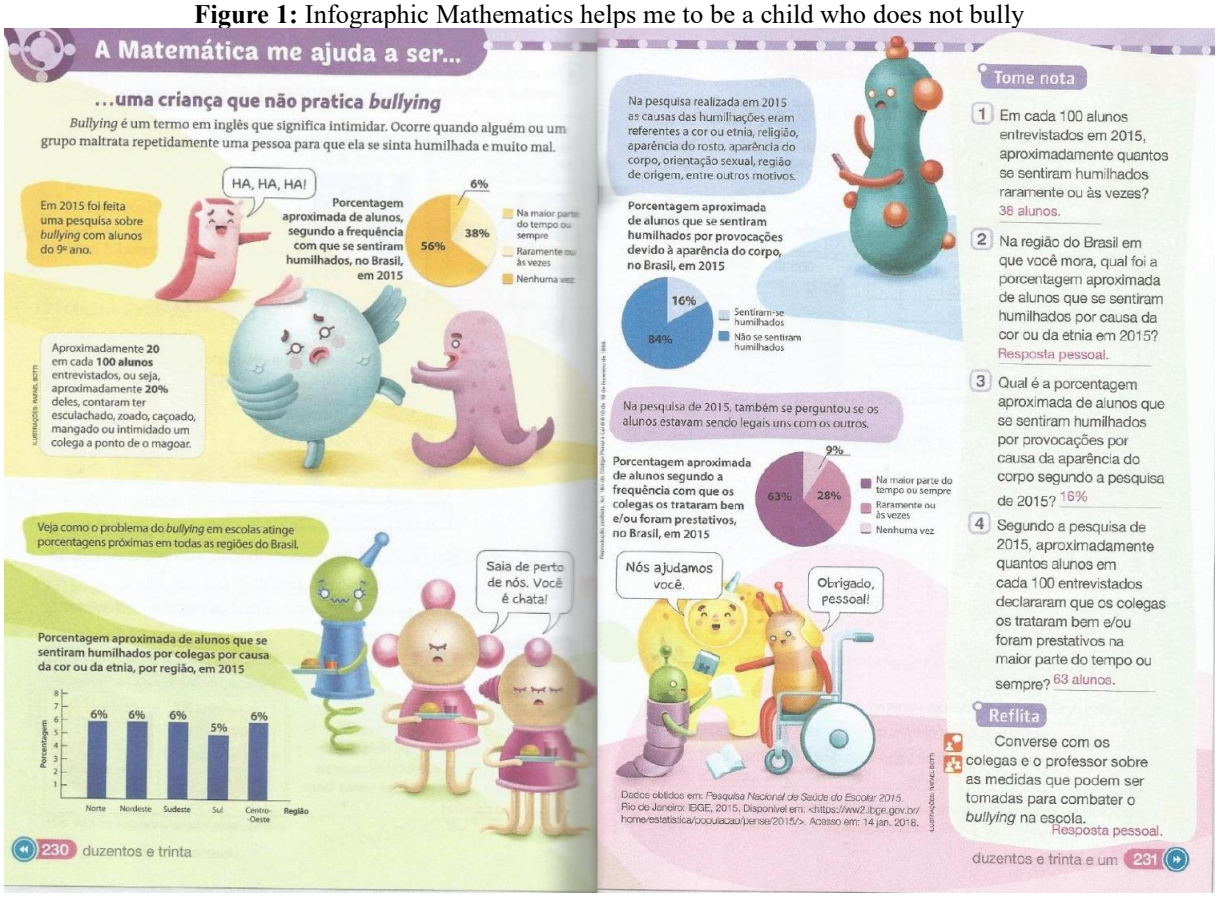
The present research utilizes a Survey Research methodology, which according to Shaughnessy; Zechmeister & Zechmeister (2012) is a “research using surveys involves selecting a sample (or samples) and using a predetermined set of questions” (p.152). Surveys involve sampling, which is a characteristic of almost all behavioral research. This type of research uses the same sequence of questions with all participants so that we can compare the attitudes of different populations. In this case, the different populations are students from different grades. Thus, students organized in their classrooms and at the same time answered questions individually involving the interpretation of an infographic about bullying. This is defined as a cross-sectional study with independent samples, that is, one or more samples taken from the population at a given moment. We used a non-probabilistic sample, a convenience sample.

The study involved two classes, one with 19 3rd-grade students and the other with 20 5th-grade students, from a municipal public school in the Metropolitan Region of Recife-PE, Brazil. To preserve the identity of the study participants, they will be referred to by codes. In composing the codes, the letter *S* was used to identify that they are students, and to differentiate

them, we added numbers from 1 to 19 to identify the 3rd-grade students, and from 20 to 39 for those in the 5th grade. The activity was conducted by one of the researchers who is also a teacher of the early years.

The research instrument was developed based on the statistical infographic about bullying in schools. This infographic was the only one found by Grymuza and Guimarães (2021) in the Mathematics books of the National Textbook Program (PNLD) of 2019. The infographic used in the study (Figure 1) shows data from a survey conducted by the Brazilian Institute of Geography and Statistics (IBGE) in 2015 with 9th-grade students from all Brazilian regions. It presents percentages of students who have experienced bullying and who have felt humiliated because of their physical and cultural characteristics, but also of students who have claimed to be well treated by their peers and have not suffered bullying at school. The infographic's information and statistical data are presented through different elements, such as texts with statistical information, illustrations with speech balloons, and pie and bar charts. This infographic is presented in the 5th-grade book of the Buriti Mais collection, approved in the PNLD (2019).

Figure 1: Infographic Mathematics helps me to be a child who does not bully



Source: Editora Moderna (2017)

The choice of this infographic was made because it is an urgent issue in today's world and is in a textbook collection distributed by the Brazilian government to public schools. In addition, the information presented, at least initially, seems contradictory to common sense, which is essential to allow students to confront their life experiences, or their beliefs, with data from scientific research. Thus, this infographic presents data different from what is believed in common sense by showing that a minority of students practice or have suffered bullying, as well as that the majority of students are kind to each other.

During the diagnosis, we asked students to, after reading, individually answer a questionnaire involving four interpretation questions (Frame 1). The questions involved the overall interpretation of the information, interpretation of pie chart (locating value of category), identification and evaluation of the reliability of the source, and decision-making based on problem identification.

Frame 1: Questions for interpreting the infographic about bullying

Question	Ability	Elements of SL
1) What does this infographic talk about?	General interpretation	Literacy skills
2) How many students said they felt humiliated rarely or sometimes?	Pie Chart Interpretation	Literacy skills Statistical knowledge Mathematical knowledg
3) Where was the information taken from? Can we trust them? Why?	Source identification and judgment	Context knowledge Critical Questions Beliefs and Attitudes Critical stance
4) Based on the information presented, what do you think can be done?	Decision making	Beliefs and Attitudes Critical stance

Source: Research Data

In this study, the data analysis was conducted based on the responses provided by the students when answering the questionnaire, taking into account their ability to interpret data presented in the statistical infographic, as well as discussing the elements of Statistical Literacy by Gal (2002) mobilized by the students during these interpretations.

5 Analysis and results

Despite being an individual activity that required students' autonomy, we observed that many of them were unable to read, including some students in the 5th grade who were not yet literate. Thus, the researcher leading the activities had to read the infographic to both classes so that the students could answer the questions.

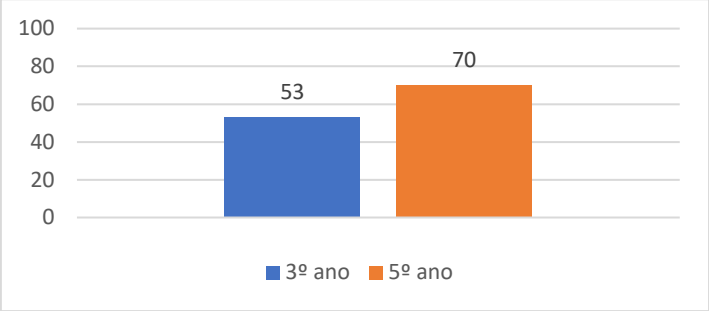
To answer the first question about the infographic's theme, students needed to identify and interpret the information in a general manner. From the analysis of the responses to this question, we observed that all students in the 5th grade (20) and the majority of those in the 3rd grade (18) were able to identify that the main theme of the infographic is bullying in schools. Students responded, for example: *"It talks about who is suffering from bullying and who is not"* (E15), *"It's about the percentage of students who bully in each region, about the students who suffered bullying because of their characteristics"* (E28). Only one 3rd-grade student failed to identify the theme because it does not specify what is being discussed about the students in the infographic, stating that *"It talks about the students"* (E11).

To answer this first question, students needed to mobilize their literacy skills because to read and understand the statistical messages present in the infographic, they needed to mobilize *text processing* skills to extract the meaning of the information, as argued by Gal (2002).

In the second question, we asked how many students said they felt humiliated rarely or sometimes according to the infographic. Students needed to interpret a pie chart locating the value corresponding to the category mentioned in the question. From the analysis of the responses (Graph 1), we can observe that the majority of students from both grades were able to interpret the pie chart by correctly locating the value corresponding to the category required

in the question.

Graph 1: Percentage of students who interpreted the pie chart by school year



Source: Research Data

Dessa Thus, these results indicate, as in other studies (Diniz, 2022; Diniz & Guimarães, 2022), that elementary school students are capable of interpreting data in pie charts accompanied by text with statistical messages. However, 5th-grade students perform better in these tasks than 3rd-grade students, as expected, since knowledge regarding percentages is indicated by the BNCC (Brasil, 2018) to be addressed from the 4th grade onwards. Thus, students from earlier grades, having not worked on the content, will have more difficulty understanding and performing tasks of this type. Despite this, Van de Walle (2009) points out that it is possible to use pie charts with elementary school students, provided that an understanding of part-whole relationships is worked on during the reading of this type of chart, as although young children do not master the understanding of percentages, they are able to compare the size of the sectors.

Students who interpreted the pie chart were able to mobilize their general literacy skills, interpreting statistical messages in both the graph and the text. Additionally, they also mobilized mathematical knowledge by recognizing percentages and demonstrating notions of part-whole relationships (half, more than half, and less than half) in the pie chart, as well as demonstrating statistical knowledge by locating data and relating variables to interpret the graph.

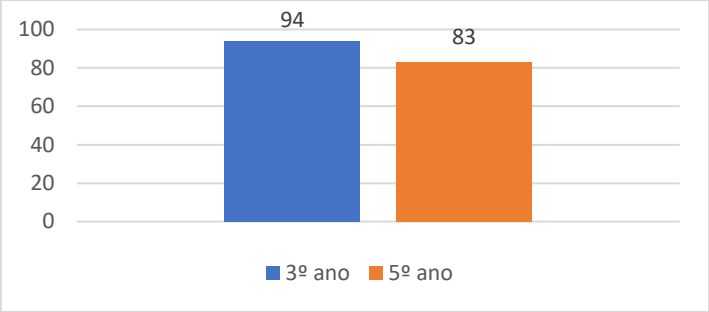
In the third question, we sought to evaluate what they knew about the importance of the sources presented in the graph, judging their reliability and justifying the judgment. This was a difficult task for the students because none of them could identify the source of the data in the infographic. This indicates a lack of schoolwork that provides students with situations to reflect on what the source of research data is, its importance, and the need to investigate its reliability.

Observing this, the researcher explained to the students, in child-friendly language, that the source of the data refers to the organization or entity that produces data from the research they conduct and showed the location of the source at the end of the infographic. Furthermore, it was explained that, in the case of the bullying infographic, the source of the data is the IBGE, explaining that it is a public institution of the Brazilian federal administration that has been operating for over 87 years, conducting surveys with people from all over the country and providing a social and economic overview of Brazil. Its data allows for the analysis of the country's situation and the development of public policies. Based on these explanations, the students were asked to revisit the questionnaire and answer whether the source is reliable and justify their answer.

Analyzing the students' responses to this question, we observed that, after learning about the source of the data, the majority of students from both grades were able to judge it and justify their judgment (16 students from the 3rd grade and 18 from the 5th grade). Additionally, as can be seen (Graph 2), among these students who made judgments about the source, both 3rd and

5th-grade students demonstrated trust in the data source and justified this trust in the IBGE because they considered that this institution conducts surveys with real people, for example: *"Yes, we can trust it because the 9th-grade students told IBGE"* (E16), *"Yes, because they interview real people, they have already come to my house"* (E33). In this sense, we observed that the difficulties in identifying and judging the source of the data in the infographic, initially identified in the students, are not related to their lack of capacity but to the fact that they have not experienced such situations before.

Graph 2: Percentage of students who trust the data source by school year



Source: Research Data

On the other hand, some students stated that they did not trust the source of the data, justifying that *"I don't trust it because there is a lot of bullying in school"* (E8) or *"No, because I have experienced bullying"* (E37). Analyzing this type of response, we observe that in these cases, the students' knowledge of the context and their beliefs outweigh the data. In their judgments, the students prioritized their personal experiences over the actual data from a nationwide survey. This occurs in different situations involving the interpretation of data familiar to readers and with different groups of people, including adults. Similar results were also observed by Cavalcanti and Guimarães (2018) when they highlighted that when the context of activities involving the interpretation of statistical data is very familiar to students, there is a tendency for students to refute the systematized data in favor of their beliefs.

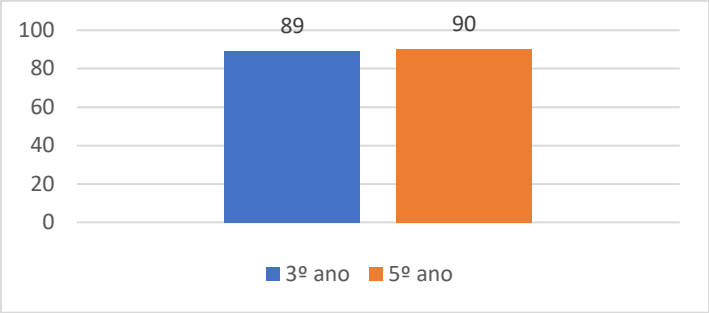
From the perspective of Statistical Literacy (Gal, 2002), we understand that, to make these judgments, students needed to mobilize their knowledge regarding the data context and the source, critical skills, showing the ability to critically evaluate the infographic data and the source information, critical stance, by demonstrating the ability to reflect on and critically evaluate the reliability of the data and the source of the information, as well as their beliefs and attitudes, by behaving critically to evaluate the data and demonstrating readiness to express opinions and believe in the legitimacy of their critical action on statistical information. Although in some students, beliefs overshadowed the data, most of them believed in the accuracy of the data due to the reliability of the source.

Therefore, we understand the need for schoolwork that allows students to know what the source of the data is and encourages them to question and investigate its reliability. But above all, they must understand that their personal experiences cannot be generalized to the context of an entire population, and thus, they cannot override the real data from a survey. In this sense, it is essential to promote classroom situations that foster this type of discussion so that students understand the importance of research and so that science prevails.

In the fourth question, we asked the student to propose a solution to the conclusion drawn from the data. The students needed to reflect on the problem of bullying in schools and propose an effective decision to address it. Analyzing the responses, we observed that the majority of them (17 students from the 3rd grade and 18 from the 5th grade) were able to make decisions aimed at resolving the problem identified in the infographic (Graph 3). A minority

did not answer the question, that is, they did not make a decision, with two students from each grade. Although there was not a significant difference in the results by grade level, we observed that 5th-grade students reflected on a wider variety of decisions.

Graph 3: Percentage of students who made decisions



Source: Research Data

The effective decisions made by the students that can help solve the identified problem involved not engaging in bullying, respecting their peers, communicating with school staff and parents, and educating about bullying in schools (only 5th-grade students made this decision). This can be observed, for example, in statements such as: *"Avoid bullying and don't do it to anyone because it's very bad"* (E2), *"Don't let it pass, tell an adult or the teacher"* (E26), and *"Put up posters in the school corridor talking about bullying"* (E38). However, other decisions do not seem to address the problem of bullying in schools, such as *"Changing schools"* (E8) and *"Ignoring those who bully"* (E35), as this would simply shift the problem elsewhere or ignore its existence. In this regard, Evangelista (2021) relates students' difficulty in making effective decisions to their limited familiarity with this type of situation, the few proposals in mathematics textbooks involving decision-making, and a lack of stimulating practices by teachers. When encouraged, students in the early grades demonstrate the ability to make good decisions.

We emphasize that, as discussed earlier, the majority of students interpreted the statistical information presented in the bullying infographic. However, in addition to understanding the information, they also identified the problem discussed in the infographic and made decisions to address it. Thus, according to Gal (2002, p. 4), "the critical evaluation of statistical information (after it has been interpreted) also depends on additional elements: the ability to access critical questions and to activate a critical stance, which, in turn, is supported by certain beliefs and attitudes". In this way, students demonstrated the ability to behave critically by reflecting on the information and possible solutions to the identified problem, as well as demonstrating a critical attitude to communicate their decisions and belief in the legitimacy of their action regarding statistical information.

6 Conclusions

In this study, our objective was to investigate how 3rd and 5th-grade elementary school students interpret a statistical infographic about bullying in schools, considering the elements of Statistical Literacy mobilized by them.

We found that although the majority of students demonstrated competence in interpreting the graphs, 5th-grade students showed better performance in interpreting pie charts. From the perspective of Statistical Literacy, we understand that to perform this task, students mobilized literacy skills to interpret statistical messages in graphs and text, mathematical knowledge by recognizing percentages and presenting notions of part-whole relationships (half, more than half, and less than half) in the pie chart, as well as demonstrating statistical

knowledge by locating data and relating variables to interpret the graph.

It was noted that the majority of students were unaware of what the source of the data in a survey was and what its purpose was. However, after reflecting on them with the researcher, they were able to make judgments about the reliability of the information presented. It is understood that beliefs are fundamental for reflecting on and critically evaluating statistical information, and that they are personal convictions and ideas that take time to develop, influenced by cultural factors, being the first factors to influence data interpretation. However, a statistically literate citizen understands that their beliefs and personal experiences cannot be generalized to the entire population, and therefore understands that their beliefs cannot outweigh the data from real research from reliable sources.

Finally, regarding decision-making, as we had reported, the majority of students from both grades were able to make decisions, highlighting that this did not prove to be a difficult task for the students, possibly because they knew the context of the data and were therefore able to opine and reflect on the identified problem. Thus, it is understood that students demonstrated the ability to behave critically by critically reflecting on the information and possible solutions to the identified problem, as well as demonstrating a critical attitude to communicate their decisions and belief in the legitimacy of their critical action on statistical information.

This study contributes to the understanding of the development of Statistical Literacy in elementary school students, highlighting the importance of cognitive and dispositional elements in the ability to interpret statistical infographics and make effective decisions. The in-depth analysis of these aspects provides relevant support for the improvement of educational practices aimed at developing statistical skills from the early years of schooling.

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