

Research Article

Examining the effect of a picturebook reading intervention on younger school age children with different reading skills and vividness of visual imagery

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This mixed-methods study examines the effectiveness of an intervention program designed to enhance the comprehension and interpretation of verbal-visual narratives, commonly known as picturebooks, among younger school-age pupils. The phenomenological approach explores how picturebooks influence comprehension in pupils with varying levels of visual imagery vividness, reading imagination, and reading comprehension skills. A total of 25 third-grade pupils participated in the study, 10 in the experimental group and 15 in the control group. The research used a quasi-experimental design that included content analysis, questionnaires, and semi-structured interviews to assess pupils' responses to the picturebook intervention. The intervention program focused on determining the effectiveness of picturebooks for pupils with different reading abilities and strengths in visual imagery, while also suggesting strategies for their educational use. Descriptive statistics were used to analyze the distribution and frequency of pupil responses across interpretive categories, providing an overview of trends in comprehension and inferencing. In addition, Fisher's exact test was applied to examine the statistical significance of differences between the experimental and control groups. The results supported the effectiveness of the intervention, confirming significant differences in deeper-level comprehension between the two groups.

Keywords: Child of younger school age; Multimodal literacy; Phenomenological study; Picturebook; Reading intervention; Visual imagery

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1. Introduction

In recent years, there has been an increasing focus on the decline in reading literacy on an international level. This is evidenced by the results of the international PIRLS (Mullis et al., 2023) and PISA tests (OECD, 2023), which highlight stagnating or declining performance in many countries. In Slovakia, PIRLS 2021 data demonstrate a marked decline in reading performance among fourth-grade pupils in comparison to preceding cycles, thereby reflecting a generalized trend whilst simultaneously exposing particular national challenges. To illustrate this point, it is notable that countries such as Poland and Finland have successfully implemented effective reading support strategies and literacy interventions. In contrast, Slovakia has not yet introduced similar approaches on a large scale. At the same time, today's pupils are immersed in a highly visual

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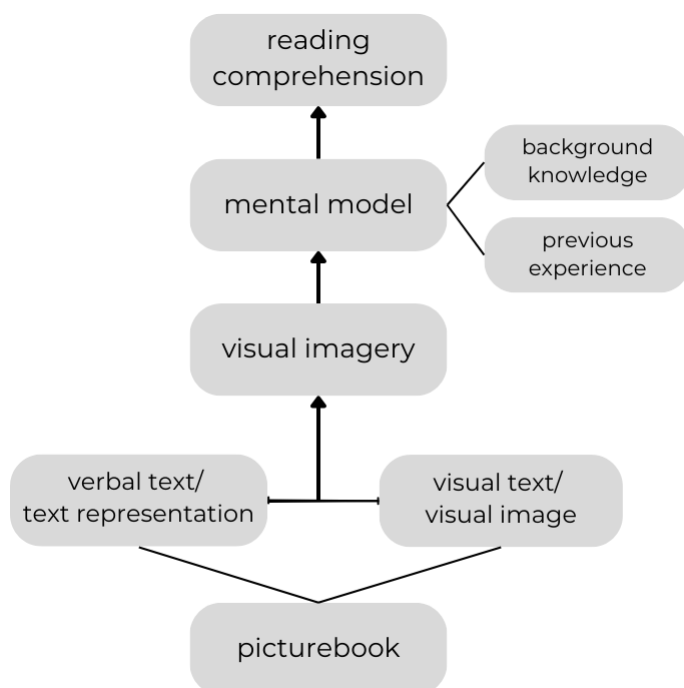
world, surrounded by images in the press, advertisements, social media, and online platforms. As a result, the concept of literacy has expanded beyond the traditional ability to decode and comprehend written text to include visual literacy, grounded in visual grammar (Kress & van Leeuwen, 2006). Pupils are therefore expected not only to read text but also to interpret and derive meaning from visual information. Although PIRLS and PISA provide valuable insights into pupils' reading skills, they do not offer sufficient detail on the effectiveness of targeted educational interventions. A notable gap in Slovak research is the limited exploration of how picturebooks, especially those with complex text-image relationships, can support the development of both reading and visual literacy. In contrast, international research increasingly emphasizes the potential of multimodal texts to cultivate interpretive and inferential skills. This study aims to address this gap by exploring picturebook-based intervention that foster reading comprehension among younger school-aged children, with a focus on the Slovak educational context.

2. Theoretical Overview

Verbal-visual narratives, or picturebooks, constitute a significant phenomenon in contemporary children's literature (Kümmerling-Meibauer & Meibauer, 2013; Kümmerling-Meibauer et al., 2022) and have attracted considerable scholarly interest. They represent a literary form combining both verbal and visual narration, or the image prevails over the text, which is minimalistic, but thought-provoking. Illustrations do not only accompany the text, as in an illustrated book but act as a unique semantic unit, which, in combination with the verbal component, expands the interpretive field of the recipient. When reading them, it is necessary to notice the multiple components that are part of them. For example, the artistic technique, the choice of colors, shapes, and lines, the shape and layout of the illustrations and their relationship to the text, as well as the perception of the front and back cover, the frontispiece, and the title page (Sipe, 2001). By arranging the text and images differently, picturebooks provide multiple ways of constructing meaning, thereby actively engaging the reader in the reading process. For example, according to Serafini (2013), the construction of the verbal and visual components has the form of a symmetrical, complementary and contradictory relationship. In a symmetrical relationship, the visual information is parallel to the textual information, where the narrative carries the same information through two different modes of representation. In a complementary construction, the visual component augments the textual one with new or complementary information and vice versa. The contradictory relation is for the more experienced recipient, as it is built on the mutual contradiction of image and text. The verbal-visual narrative has therefore the potential for more complex mental model formation as well as overall comprehension of the read text.

In a foreign context, researchers point to the positive effects and benefits of using picturebooks in many educational areas. Previous research has pointed to a synergistic relationship between the text and the visual component, which positively influenced the recall of information from the story, and the actual inferring of meanings that readers drew from both the verbal and the visual components (Narey, 2021; Schüler et al., 2015). This aligns with dual coding theory (Paivio, 1971), which states that verbal and non-verbal (visual) information is processed through separate but interconnected cognitive channels, and that learning is enhanced when both are activated simultaneously. From the position of cognitivist research, the reception of pictures involves using mental images and their implementation in one's mental states and cognitive processes (see multimedia learning theory, Mayer, 2001). Thus, in literature it involves the reader's self-projection into the situations of fictional characters and the literary world, which influences them in their learning, moral, emotional, and axiological development. This process is described by the situational model of text comprehension (Zwaan & Radvansky, 1998), which suggests that readers build a dynamic mental representation of the described situation, integrating textual and visual cues to simulate events and actions as if they were experienced in real life. Figure 1 illustrates how picturebooks enhance reading comprehension through the interaction of verbal and visual modes.

Figure 1
Picturebook reading process



Picturebooks provide both verbal and visual text, which, when combined, stimulate the formation of mental visual images in the reader. This process is explained by the dual coding theory. These mental images are integrated with the reader's background knowledge and prior experience to construct a mental model of the story, characters, and events. The situational model of text comprehension posits that this mental model enables the reader to simulate the narrative situation, thereby facilitating a more profound comprehension and emotional engagement. Consequently, picturebooks have been shown to support the development of reading comprehension and to significantly enrich it.

The impact of picturebooks or their synergistic effect in promoting and improving the level of readers' imagination and comprehension of the read text has been addressed by researchers (e.g., Boerma, 2016; Serafini, 2011; Serafini et al., 2020). The positive impact of picturebooks on readers with lower levels of imagery and reading comprehension has been pointed out by researchers (e.g., Amalia et al., 2020; Hibbing & Rankin-Erickson, 2003; Lohfink, 2015; Pantaleo, 2023).

While these studies provide valuable international insights, it is equally important to consider how these findings resonate within specific national contexts. In the Slovak context, there has been a noticeable increase in the production of picturebooks and the growing interest in theoretical research on their reception by children in the domestic, Slovak context (e.g., Andričíková, 2017; Gal Drzewiecka, 2019; Gal Drzewiecka & Lešková, 2018). We consider it important to respond to verbal-visual narratives, particularly regarding their potential use within the context of primary education, in terms of creating a specific aesthetic situation in which the fictional narrative (picturebook) confronts the representation of the real world in the mind of the child recipient. By addressing this research problem, we aim to develop the outlined issue, which is minimally reflected in Slovak pedagogical research, concerning the construction and interpretation of the meaning of the story in picturebooks by children of younger school age. The research problem of the study responds to the absence of the empirical research on this phenomenon (impact of picturebooks on pupils with different levels of imagery and reading comprehension) in the Slovak research area. At the same time, we intended to highlight the possible positive impact of reading and interpreting picturebooks on the comprehension of narrative text for pupils with different

reading competencies. The main aim of the research was to test the effectiveness of the intervention program on the comprehension and interpretation of verbal-visual narratives by a pupil of younger school age. The research problem was formulated as follows: The influence of verbal-visual narrative on the comprehension of text by a pupil of younger school age with different levels of the vividness of imagery, reading imagination and reading comprehension. We attempted to investigate this research problem by answering the following questions:

RQ 1) What is the difference in the comprehension of text and verbal-visual narrative in younger school age children?

RQ 2) What is the effect of the intervention program on comprehension and interpretation in younger school age children with different levels of reading comprehension, reading imagination and vividness of imagery?

3. Method

In the research we dealt with the issue of semiotisation of picturebooks i.e., how a pupil can integrate a new experience (aesthetic experience of an artistic narrative), process, understand and interpret the information from the verbal and visual parts according to the visual imagery, i.e. newly acquired knowledge into his/her cognitive structures, and apply it to life, what is the influence of reader's visual imagery on the comprehension of a narrative, and how the picturebook influences the comprehension of pupils with different reading competences.

3.1. Research Design

In our research, we lean towards a phenomenological approach (Gavora, 2006) that explores the structure of human conscious experience. This approach aims to understand human thinking and behavior, exploring the structures of consciousness, the ordinary experience of human beings, and their experience of the world (Gavora, 2006). Phenomenological analysis intends to reveal the experience of the world of the participants. Experiencing "the world" is a person's feelings, thoughts, and self-awareness. From this "world", the researcher selects one phenomenon – the phenomenon, which is the event, situation, object, person, or group of people that he/ she is trying to understand.

In addition to the phenomenological approach, we employed a qualitative quasi-experimental mixed-methods design, which enabled us to explore the impact of the intervention on pupils' interpretive comprehension in both experimental and control classroom settings. Such quasi-experimental approaches are common in educational research where natural classroom groupings are maintained (Cohen et al., 2018; Creswell, 2018). Our design aligns with van Velzen's (2019) proposal for qualitatively driven (quasi-)experimental designs, which prioritize in-depth qualitative insights while still incorporating controlled comparisons. This framework allowed us to systematically examine both measurable effects and participants' lived experiences, as emphasized in phenomenological research (van Manen, 2016). Descriptive statistics were used to summarize the frequency of different interpretive responses, and Fisher's exact test was applied to assess whether group differences in response patterns were statistically significant, an approach appropriate for small samples and categorical data. Both analyses were conducted using the Jamovi software (version 2.6.26), which supports transparent and reproducible statistical analysis.

This mixed approach allowed both an in-depth understanding of individual experiences and a comparison of outcomes between participants with varying reading competences. The intention of this research was an in-depth understanding of phenomena – literary texts, specifically verbal-visual narratives, from the position of researching the relationship between image and word, and how their synergistic effect affects the comprehension of the text and reading imagination in a child of younger school age. In our research, we explored how individuals perceive and make sense of their experiences. In the context of picturebook education, we emphasized the subjective experiences of pupils, aiming to uncover the meanings they derive from interacting with picturebooks. Within the phenomenological approach, we encouraged pupils to express their

experiences and viewpoints, fostering a deeper connection with the material, exploring different perspectives and developing empathy through their engagement with characters and stories.

3.2. Research Phases

In the context of the research problem and the related research questions, we applied the following research methods. The methods described followed the three-phase research. In the first phase of the research, we conducted a content analysis of picturebooks to examine how the relationship between image and text is constructed in selected contemporary Slovak and translated works. The outcome was a representative set of six picturebooks, which we analyzed and later used in the second and third phases of the research. In the second (diagnostic) phase, we deliberately selected 3rd-grade pupils with varying levels of vividness of visual imagery, reading imagination, and text comprehension. In the third phase, we designed and validated the intervention program for working with picturebooks. We then compared the results of the intervention program through semi-structured interviews with both an experimental and a control group. At this stage, we also proposed recommendations for the practical use of verbal-visual narratives in the educational process.

3.3. Research Sample

In the first phase, the research sample consisted of inanimate entities (Gavora, 2006), specifically a set of verbal-visual narratives. The criterion for data selection was the dominance of the aesthetic function, which created the preconditions for an aesthetic experience conducive to the development of the reader's imagination. Thus, the selection was based on the artistic and aesthetic qualities of the picturebooks. From a total of 158 contemporary domestic and translated picturebooks, we identified a representative set of six that were positively received by literary critics, met high aesthetic standards in both image and text, featured diverse relationships between image and text, and varied in design and format.

The selection of literary texts (picturebooks) was also based on age appropriateness, ensuring suitability for 3rd-grade pupils. Each picturebook thematically conveyed universal values such as friendship, mutual support, and mutual respect. The chosen themes aligned with the cognitive abilities and comprehension processes of younger school-age children. In terms of aesthetic quality, the selected picturebooks provided a meaningful aesthetic experience for the child reader. Each book presented a cohesive unity of storyline, theme, and idea through both visual and textual components. The picturebooks were distinguished by high-quality artwork, artistic style, and technique. The text exhibited a unique style and poetics, serving as a unifying element of the story. It was minimalist and concise, allowing the narrative to transcend the pages and remain open to interpretation. The storyline encouraged readers to reflect on the world, fostering engagement and imagination. The plot, theme, characters, mood, and atmosphere were clearly conveyed through illustrations, while the interplay between text and image actively invited the reader's response and participation in meaning-making. The selected picturebooks are listed in the Table 1, categorized by research phase, level of metaphorical richness, and cognitive complexity (from lowest to highest).

In the second and third phases, the research sample comprised both living entities (a deliberately selected group of third-grade primary school pupils) and non-living entities, namely, the products of receptive-interpretive activities. These included verbal and non-verbal responses, such as written answers on worksheets within the intervention program. The selection of this age group was based on the recognition that picturebooks serve as an age-appropriate tool for motivation, reading skill development, and imagination enhancement. As noted by Čačka (1999), the use of illustrative and pictorial material during this period is crucial, as it enhances both motivation and memory formation. Our research employed criterion-based participant selection (Gavora, 2006) alongside theoretical participant selection (Silverman, 2005). The sample of participants in the second (diagnostic) phase consisted of 25 third-grade pupils (available sample).

Table 1
Selected research sample of picturebooks

<i>The phase of the research and author/illustrator</i>	<i>Name of the picturebook</i>	<i>Type of text-image relationship according to Serafini (2013)</i>
2nd (diagnostic phase) Henrik Hovland and Torill Kove (2013)	Johannes Jensen feels different	symmetrical
3rd (intervention program) Katarína Macurová (2018)	Theo, the Flea	complementary
Lani Yamamoto (2017)	Stína	complementary
Edward van de Vendel and Marije Tolman (2021)	The Little Fox	complementary
Carmen Chica and Manuel Marsol (2022)	Giant's time	contradictory
3rd (verification of the intervention program) Slavka Liptáková and Fero Lipták (2012)	Dierožrút	complementary

While the number of participants is relatively small, this is appropriate for an in-depth, qualitative exploration of individual differences in reading and visual imagination. A smaller sample allows for a more focused and nuanced analysis of pupils' experiences and interpretive processes, aligning with a phenomenological approach that seeks to understand how children make meaning from text and image. Following the administration of questionnaires designed to assess reading imagination and the vividness of visual imagery, in addition to interviews focused on reading comprehension, a sample of 10 pupils was purposefully selected for the experimental group. The selection criteria ensured equal gender representation (6 girls and 4 boys) and included a range of visual imagery abilities, reading imagination, and reading comprehension skills. This purposive sampling method facilitated a more nuanced interpretation of the potential impacts of the intervention, while simultaneously emphasizing the heterogeneity of perspectives within the group.

3.4. Data Collection

To comprehensively explore the effects of a reading and visual literacy intervention on pupils' reading comprehension and interpretation of picturebooks, we employed a combination of quantitative and qualitative data collection methods. These included standardized questionnaires and semi-structured interviews. Each method served a specific function within the broader research design, from initial diagnostic classification to detailed analysis of textual and visual understanding. The integration of multiple tools allowed for a richer, triangulated insight into the processes and outcomes of picturebook reception.

3.4.1. Questionnaires

In the second, diagnostic, phase, when selecting the sample of research participants, we used standardized questionnaires to measure the vividness of imagery and level of reading imagination. In this case, we used Sheveland's (1992) questionnaire, which consisted of a set of 21 items divided into seven categories, respectively, sensory modalities (sight, hearing, touch, movement, taste, smell, and feeling), with Likert scaling, detecting 5 degrees, or levels of imagination (very clear: vivid, moderately clear and vivid, not clear but recognizable, vague and dim, no image just know). The validity and reliability of the questionnaire was confirmed after it was administered to 380 pupils in grades 3 to 6, and the scale showed internal consistency (Cronbach's alpha was .88). At the same time, in the second phase, we also used a questionnaire to detect the level of reading imagination (Boerma, 2016). The questionnaire consisted of nine questions on imagery related to the visual aspect (e.g., When I read, I see (in my mind) what the environment where the story takes place looks like.) and the mental aspect (e.g., When someone feels happy in a story, I feel happy

too.). The questionnaire was designed to measure children's general ability to form mental images when reading. The validation of the questionnaire was conducted on a large sample of pupils (fourth, sixth, eighth and tenth graders) and the scale showed internal consistency in terms of reliability (Cronbach's alpha was .89). Before addressing the questionnaire, pupils were instructed to choose the answer that would best characterize their answers on a scale ranging from: never, sometimes, often, and always.

The purpose of administering these questionnaires was not to statistically test differences or relationships, but solely to support the purposive selection of participants for the experimental and control groups. Answers from the questionnaires had certain points according to which we divided pupils into three categories. The selection was subject to the following criterion: pupil with high, average and low levels of vividness of imagery, reading imagination and consequently comprehension of the read text. We ensured a balanced gender representation (6 girls and 4 boys) and included participants with diverse levels of imagery and imagination based on the questionnaire scores, to form groups that were qualitatively different in these characteristics (see Table 2).

Table 2

Selection of research participants into the experimental group

	<i>Level of vividness of imagery and reading imagination</i>		
	<i>High</i>	<i>Average</i>	<i>Low</i>
Sheveland (1992)	very accurate and vivid imagery, moderately accurate imagery	inaccurate but recognisable image	vague and dim image, no image just know the object
Boerma (2016)	always	often, sometimes	never
Selection of participants	3 girls, 1 boy	2 girls, 1 boy	1 girl, 2 boys

3.4.2. Semi-structured interview

In the second phase of the research, we used individual semi-structured interviews to measure comprehension of a literary text and a verbal-visual narrative to ascertain the level of comprehension of the verbal-visual narrative (text-image version) and its adapted version, i.e., the literary text (text version without the visual component) that was created for the story Henrik Hovland, Torill Kove *Johannes Jensen feels different*. The questions focused on information related to the content of the story (explicitly present in the text), but also on the production of inferences indicating the overall understanding of the story. Pupils read the story twice and then answered the questions without having the story at their disposal, i.e., based on their recall of the story after reading the text. In addition to comprehension, the questions in the semi-structured interview focused on the vividness of the imagery, the ability to statically visualize the description/object, the ability to dynamically visualize the action/movement, memorability of the imagery, and imaginative inference. A semi-structured interview was used to ascertain the quality of the pupil's interpretive ability as well as their level of imagery ability. We purposively selected pupils with different levels of text comprehension and visual imagery (Sheveland and Boerma questionnaires) to work within the intervention program. From a total of 25 participants (two 3rd grade classes), we selected 10 research participants for the experimental group. The recordings from the semi-structured interviews with each participant were transcribed and subjected to content analysis.

The individual semi-structured interview was also used in the third phase of the research to ascertain the reception of the verbal-visual narrative *Dierožrút* and to verify the effectiveness of the intervention program. The interview was conducted in both groups (experimental and control group) to compare the results of the intervention program. During the interview, we observed the reception of the verbal-visual narrative by Slovak authors, S. and F. Lipták, entitled *Dierožrút*. As this book was demanding for reception, we prepared pupils for the book with a short discussion. The questions in the semi-structured interview were designed for specific double-page spreads,

and we used them to monitor the ability to perceive peritextual elements, characterize and compare the characters of the story, detect the symbolism of colors, interpret the placement of the characters in the story, “read” fictional referentiality to the real world and to infer the meaning from visual analogies. We also analyzed the extent to which illustrations help to create a coherent situational model for different readers (different levels of text comprehension and reading imagination). The recordings of the semi-structured interviews with each participant were transcribed and analyzed using content analysis, involving systematic coding and categorization of participants' responses.

3.5. Intervention

The intervention program aimed at developing pupils' ability to perceive and interpret verbal-visual narratives. The intervention program that we created consisted of eight educational activities (eight 45-minute-long lessons within the subject of Slovak language and literature within two months) for working with verbal-visual narratives. The intervention program aimed to teach pupils to read and interpret the meanings of a selected picturebook from both the verbal and visual parts. In the intervention program, we worked with four selected picturebooks. The selection respected the principle of sequencing or proceeding from a book with lower cognitive demand to a book in which there was a contradictory relationship between the picture and the text. The intervention program consisted of eight educational units that focused on eight areas of visual literacy. The content of the educational units was verbal methods, i.e., conversation, discussion, and explanation. We also used concept maps and clustering, which activated the pupils' thinking. At the beginning of each lesson, we created a relaxed atmosphere that prepared the pupils thematically for reading the selected picturebook. For the shared reading of the picturebook (we alternated between the teacher's reading and the pupil's reading), we used a data projector with a scanned picturebook so that it was sufficiently visible to each pupil. After reading the book, we recapped the story through questions. The story recap was followed by an activity in which we explained how we read the picturebooks in each area. While interpreting the picturebooks and illustrations, we encouraged pupils to respond spontaneously and then guided them to the narrative function of the illustration. This was followed by reflection and discussion. The main objectives of the intervention program were to notice details in illustrations, to understand different text-image relationships, to use imagination in interpreting the textual and visual components of the picturebook, and to develop the child's visual and intellectual thinking through the picturebook.

In the first two educational activities, we worked with the picturebook *Theo, The Flea*. The first educational unit was focused on the perception of the peritextual elements of the picturebook (front and back cover of the book, introductory and concluding frontispieces of the book, title page) involved in the creation of the meaning of the picturebook. In the second educational activity, we worked with the external and internal characteristics of the main and secondary characters. In the third and fourth educational activities, we used the book *Stína* by L. Yamamoto and worked with the pictorial (metaphorical and color) representation of emotions. In the fifth and sixth educational activities, we worked with the book *The Little Fox* by E. van de Vendel which clarified the location of the character in the space and the concept of theory of mind. In the last two educational activities, we worked with the category of time and the perception of the contradictory relationship between image and text in M. Marsol's book *The Giant's Time*.

3.6. Data Analysis

We applied content analysis in the content-form, literary-aesthetic, and visual-aesthetic analysis of six selected literary works, i.e., in the analysis of the construction of the relationship between image and word in the selected picturebooks (the 1st phase). Subsequently, we used it in identifying the reception of picturebooks by a child of younger school age, in analyzing their personal verbal statements and responses from questionnaires aimed at detecting visual imagery and reading imagination (the 2nd phase), from a semi-structured interview aimed at detecting the

ability to comprehend a text and text-image version of the literary narrative (the 2nd phase), and in analyzing the answers from semi-structured interview to verify the effectiveness of the intervention program (the 3rd phase). In the 3rd phase, thematic analysis was employed using systematic coding. The participants' responses were coded into categories, and an occurrence count was used to quantify the frequency with which different types of inferences (emotional, symbolic, figurative, etc.) appeared across the experimental and control groups. Descriptive statistics were applied to summarize and compare the distribution of categorical responses within and between groups. To evaluate the statistical significance of differences in response patterns, Fisher's exact test was employed, as it is appropriate for small sample sizes and categorical data. Both analyses were conducted using Jamovi (version 2.6.26). The following Table 3 demonstrates the categories of pupil's responses and the description of each answer.

Table 3
Categories of pupils' responses

<i>Category</i>	<i>Abbr.</i>	<i>Description</i>
Emotional inference	EmoInf	Child infers feelings from text/image
Symbolic understanding	SymUnd	Child sees deeper meaning behind objects
Character development	CharDev	Child tracks changes in character
Reflection on human behavior	Reflect	Child connects to real-world behavior
Reading visual cues	VisCues	Child reads details from illustrations
Linking image and emotions	ImgEmo	Child connects illustration to emotion
Figurative language	FigLang	Child explains idioms
Awareness of core theme	Theme	Child identifies main idea
Moral reflection	Moral	Child expresses moral learning
Misinterpretation	Misint	Child misunderstands text/image
Explicit inferences	Explicit	Child states what is directly stated/ visible
Implicit inferences	Implicit	Child reads deeper meaning, not said directly
Don't know answers	Don't know	Child says they don't know or forget

4. Findings

In the following section of the study, we explain the results of the research problem and the related main aim of the study: To verify the effectiveness of the intervention program on the comprehension and interpretation of verbal-visual narrative by pupils of younger school age with different levels of vividness of visual imagery, reading imagination and reading comprehension by answering the individual research questions.

4.1. Comprehension of Text and Verbal-Visual Narrative

In the first research question we were interested in the difference in comprehension and eventual recall of text and verbal-visual narrative in younger school age pupils. For comparison, we used the text *Johannes Jensen feels different* in its experimental form, i.e., the text form and then the text-image form (picturebook format). In the text-image form, pupils were instructed to perceive the illustrations in combination with the text. We conducted semi-structured interviews (with same seven open-ended questions) with 25 pupils at two-week intervals. Our aim was to highlight the potential of a picturebook (text-image form) compared to its text version. Additionally, these interviews served as a triangulation method to confirm the selection of pupils with different levels of visual imagery and reading imagination (based on the questionnaires) in relation to the reading comprehension into the experimental group.

In the first question in the semi-structured interview about the look of the main protagonist, we tested the pupils' ability to create a static visualization of a description or object. The answers in the text version were mostly based on imagination, since the image of the protagonist was omitted. As shown in Table 4, out of 25 pupils, 15 (60%) gave accurate descriptions, while 10 (40%) were either vague or incorrect. In contrast, the text-image version yielded much more precise and

consistent responses: 22 out of 25 pupils (88%) correctly identified key visual traits such as Johannes being a green crocodile, wearing clothes, having a long tail and distinct facial features. Only 3 pupils (12%) gave inaccurate responses. This marked improvement confirms that the illustrations significantly supported mental image construction and visual recall.

Table 4

Static visualization accuracy

Version	Q1 – Static Visualization Accuracy		
	Accurate (n)	Inaccurate (n)	% Accurate
Text	15	10	60%
Text-image	22	3	88%

The second question explored why Johannes felt everyone was looking at him and what he thought they noticed. This assessed not just memory but the pupils' ability to interpret Johannes's inner perspective, his mentalization. In the text-only version, 11 pupils (44%) correctly inferred that Johannes's perception was shaped by his own feelings of difference, while 14 pupils (56%) gave more surface-level or literal interpretations (see Table 5). In the text-image version, however, 21 pupils (84%) demonstrated an understanding of Johannes's internalized perception and scored as having inferred mentalization, while only 4 pupils (16%) did not. These results strongly suggest that the visual representation of the character's emotions enhanced the pupils' capacity for empathy and internal perspective-taking. Pupils deduced that, in addition to feeling different and having a tail, he also felt different because he was a crocodile. The idea of Johannes' otherness of everyone looking at him was only in his mind. Four participants (16%) in the text-image version also indicated that Johannes had created this idea himself because in reality (which was also confirmed in the picture) nobody was looking at him: *well, because he thought he was different and therefore, he thought that everybody was looking at him on the bus, even at work.*

Table 5

Mentalization/ perspective understanding

Version	Q2 – Mentalization / Perspective Understanding		
	Inferred Mentalization (n)	No Inference (n)	% Mentalization
Text	11	14	44%
Text-image	21	4	84%

In the third question, we explored the secondary character Dr. Mountain's image. While we initially expected the text version would elicit more detailed descriptions due to the presence of more explicit narrative cues, the results indicated otherwise. As can be seen from the Table 6, only 9 pupils (36%) in the text-only version described both physical traits and the doctor's role or emotional function. In contrast, in the text-image version, 19 pupils (76%) gave richer and more complete descriptions. Research participants reported that he, e.g.: *was an elephant, had big ears and a long nose, wore an aucultoscope around his neck, wore a white coat, had a gruff voice and had a flashlight.* In addition to external characteristics, 2 participants (8%) in the text-image version reported that he helped Johannes with his otherness by also listing his own imperfections: *he was a doctor and helped Johannes to become a different person. He just told him when he is different, well...,that being different is not a bad thing, Doctor Mountain said that big ears can be useful, and you can cover your eyes with them when you are watching a scary movie.* In the text-image version, the participants clearly benefited from visual reinforcement, which aided in integrating both literal and inferential information about the character.

Table 6

Detail in secondary character description

Q3 – Detail in Secondary Character Description			
Version	Described Role/Traits (n)	Vague/Only Physical (n)	% with Rich Detail
Text	9	16	36%
Text-image	19	6	76%

The fourth question focused on the ability to understand cause and effect. This question was problematic in the text version, where only 7 pupils (28%) were able to identify that Johannes's injury resulted from tying his tail around his body and falling. The remaining 18 pupils (72%) gave incomplete or incorrect answers (see Table 7). For example, they thought it happened because: *he was staring at the palace, came to the curb, and fell, slipped, fell from a great height, went through the alleys and scratched his tail, was running and tripped over a stone, was coming home from work lost in thought and wasn't looking at the road, tripped over his tail, or tripped over a stone*. In contrast, the text-image version showed a substantial improvement: 16 pupils (64%) correctly understood the cause-effect chain, while 9 still struggled. These results highlight the advantage of the visual format in helping pupils mentally reconstruct action sequences and understand narrative logic.

Table 7

Cause and effect accuracy

Q4 – Cause and Effect Accuracy			
Version	Correct (n)	Incorrect (n)	% Correct
Text	7	18	28%
Text-image	16	9	64%

In the fifth question, we explored both the memorability of information and the extent to which pupils' responses were creative. In the text-only version, only 8 pupils (32%) achieved full recall of the four possible tail uses, whereas 17 pupils (68%) focused instead on imaginative elaborations beyond the text (see Table 8). In contrast, the text-image version exhibited a significant shift in the results: 20 pupils (80%) achieved full recall, while only 6 pupils (24%) engaged primarily in fantasy elaboration. The findings of this study indicate that the incorporation of illustrations significantly enhances the retention of narrative details among pupils, while the absence of visual supports fosters more extensive imaginative elaboration among the text-only version of the story.

Table 8

Recall and fantasy elaboration

Q5 – Recall and Fantasy Elaboration				
Version	Full Recall (n)	Fantasy Elaboration (n)	% Full Recall	% Fantasy Elaboration
Text	8	17	32%	68%
Text-image	20	6	80%	24%

In the sixth question, we examined what parts or passages of the story pupils found difficult to understand. The results have been summarized in Table 9. According to Table 9, in the text-only version, 2 pupils (8%) reported difficulty with specific vocabulary (such as “tie” and “aucultoscope”). However, these challenges were largely reduced in the text-image version, where only 1 pupil (4%) reported any difficulty, likely because the illustrations provided contextual support. This finding suggests that the incorporation of images not only enhances narrative comprehension but also functions as a scaffold for lexical understanding, thereby facilitating the decoding and interpretation of unfamiliar terms by younger readers.

Table 9

Comprehension difficulty

Version	Q6 – Comprehension Difficulty		
	With Difficulty (n)	No Difficulty (n)	% with Difficulty
Text	2	23	8%
Text-image	1	24	4%

The seventh question explored the imaginative potential and depth of the pupils' responses. In the text-only version of the study, most pupils (24 out of 25) relied on static visualization or action-based imagination (e.g. describing tripping or fainting events), while only one pupil (4%) demonstrated deeper forms of empathy or internal mental imagery (see Table 10). In the text-image version, there was a notable improvement: 6 pupils (24%) were able to express empathetic or complex mental representations of Johannes's feelings of otherness and internal conflict. These findings suggest that images not only enhanced basic story comprehension but also supported the process of mentalization, enhanced empathy towards the character and enabled the development of more complex mental images, which was essential for overall story comprehension.

Table 10

Imaginative elaboration

Version	Q7 – Imaginative Elaboration		
	Static visualisation/ Action-Based Imagination	Empathy/Mental Imagery	% Empathy/Mental Imagery
Text	24	1	4%
Text-image	19	6	24%

Comparing the two individual semi-structured interviews, we can conclude that the pupils understood and were able to retell parts of the story more accurately and precisely than in the text version. Studies by Gambrell and Jawitz (1993) show similar results in dual coding theory. The pupils' task was to read a text to themselves and then answer 16 questions. The results of this research showed that the text which contained illustrations helped pupils to form a mental image and increased their reading performance. At the same time, the illustrations combined with the text significantly increased comprehension of the text and recall of information from the text. These results correspond with the results from the diagnostic phase of our research. After reading the text version of the story and the text-image version of the story, the pupils were not only able to remember more information from the picturebook, but the illustrations helped them to develop a more complex mental model, which eventually improved their overall comprehension of the story.

After reading the text-image version, 16 out of 25 pupils ($n = 25$; 64%) were able to make longer, more complex, and more precise statements during the interview. Both the comprehension of the text improved, and the pupils also remembered more information from the text. Pupils' ideas about the text were holistic. The use of mental images in combination with an illustrative component proved to be an appropriate strategy for remembering and linking parts of the text. Compared to the text version, pupils did not report any difficulties in understanding the text after reading the text-image version. In the text version, unknown words made it difficult to understand the text, the meaning of which became clear to the pupils in the text-image version. After reading the text-image version, pupils were able to give a more detailed description of the character in the static visualization area. While the evaluation of cause and effect in the form of the ability to dynamically visualize action/movement was misunderstood in several cases in the text version, 16 out of 25 pupils ($n = 25$; 64%) were able to evaluate it correctly in the text-image version. As the results of this phase of the research showed, the combination of verbal and visual cognition (where visual imagery is used in conjunction with the visual component in the picturebook) can contribute to a significantly better comprehension of the text when the pupils are instructed to create mental images.

4.2. Effect of the Intervention Program on Comprehension and Interpretation

In the second research question we were interested in the extent to which a picturebook intervention program would be effective for pupils with different levels of vividness of imagery, reading imagination and levels of reading comprehension. A total of 25 semi-structured interviews were transcribed. Content analysis was first applied to the transcript, which then served as the basis for conducting thematic analysis through systematic coding. Tables 11 and 12 show a detailed breakdown of the occurrences by category for the experimental and control group in total and average per pupil, including their gender and reading comprehension level (G - girl, B - boy / H - high, A - average, L - low level of text comprehension).

To complement the Table 11 and 12, the following section provides illustrative translated responses from pupils, highlighting how they expressed their understanding within each thematic category. Each quote has been selected to reflect the core feature of the category it represents.

Emotional Inference. This category involves the reader's ability to infer the emotional states of the character based on the narrative or illustrations. One pupil stated: *"He feels alone. He is surrounded by white nothingness. But the hunt for holes eventually led him to a normal life."* This quote reflects the pupil's ability to identify a sense of loneliness and trace the emotional transformation of the character through the story's progression.

Symbolic Understanding. Responses in this category show the pupil's ability to attribute deeper meanings to story elements, treating them as metaphors or symbols. A child interpreted: *"In the end, the holes were like a trap, like a mirror- at the beginning he was greedy and couldn't eat... In the end, he became friends with the female. She helped him by digging the well, which eventually changed him."* This response recognizes the holes not just as objects, but as symbolic representations of inner change.

Character Development. This category captures pupils' recognition of the protagonist's transformation over time. One pupil noted: *"First, he was gluttonous, but when he came back home, he wasn't so gluttonous anymore. He came home and drank from the well. His appetite returned."* The quote reflects a clear before-and-after characterization and a grasp of internal development.

Reflection. Pupils in this category connected the story's events to broader human behavior or life lessons, showing personal insight. A child shared: *"To a selfish person who wants everything just for themselves. [...] They don't think of others. [...] That love is important and having someone close to you."* This illustrates a shift from interpreting a fictional character to reflecting on universal values.

Visual Cues. Responses here show the pupil's attention to visual details that provide narrative or emotional information. A pupil observed: *"The female on that illustration [points to the illustration] reminds him of a well and he is smiling."* This demonstrates awareness of visual storytelling and character emotion conveyed through illustration.

Linking Image and Emotion. These responses focus on emotional interpretations derived specifically from images. One child remarked: *"Like he was scared and sad. Like he's missing something even at the end of the world."* The emotions here are inferred from the visual atmosphere rather than text.

Figurative Language. This category includes interpretations of idioms or metaphorical expressions found in the book. Children offered explanations such as: *"dumb as a brick" - "He was empty, he was dumb."*, *"heart of stone" - "He was unkind and strict."*, *"penny-pincher" - "He'd do anything for money."*, *"memory like a sieve" - "The old woman was forgetful."*

These show the ability to grasp metaphorical and idiomatic language by connecting it to everyday meanings or behaviors.

Theme. Responses classified here identify overarching ideas the book communicates. One pupil stated: *"He was greedy and didn't want to share with anyone... if he wasn't greedy, he would have friends."* Another added: *"We're chasing money, food, and work. But in reality, family is what"*

Table 11
Categorized responses in the experimental group

Gender/ Level of reading comprehension	Emo Inf	Sym Und	Char Dev	Reflect	Vis Cues	Img Emo	Fig Lang	Theme	Moral	Misint	Explicit	Implicit	Don't Know
G / H	2	4	2	3	3	2	4	1	2	-	2	7	-
G / H	2	4	2	3	5	5	4	2	2	-	3	2	-
G / H	4	1	1	4	2	2	3	1	2	1	5	2	-
B / H	3	2	2	2	3	2	4	1	2	1	4	1	-
G / A	2	5	2	5	5	5	4	1	3	-	3	5	-
G / A	1	2	1	2	3	3	4	1	2	-	5	1	-
B / A	2	1	1	-	2	2	3	1	1	-	7	2	1
G / L	3	-	-	-	1	1	3	-	-	1	7	-	-
B / L	2	2	-	2	1	1	4	1	2	-	5	4	-
B / L	-	3	1	3	4	3	3	1	3	-	3	3	2
Total	21	24	12	24	29	26	36	10	19	3	44	27	3

Note. EmoInf: Emotional Inference, SymUnd: Symbolic Understanding, CharDev: Character Development, Reflect: Reflection on Human Behavior, VisCues: Reading Visual Cues, ImgEmo: Linking Image and Emotions, FigLang: Figurative Language, Theme: Awareness of Core Theme, Moral: Moral Reflection, Misint: Misinterpretation, Explicit: Explicit Inference, Implicit: Implicit Inference, Don't know: Don't know Answers.

Table 12
Categorized responses in the control group

Gender/ Level of reading comprehension	Emo Inf	Sym Und	Char Dev	Reflect	Vis Cues	Img Emo	Fig Lang	Theme	Moral	Misint	Explicit	Implicit	Don't Know
G/H	-	1	-	-	1	1	3	-	-	1	8	-	1
G/H	3	2	1	3	2	3	3	3	3	1	5	4	-
G/H	2	2	2	-	2	2	4	-	3	-	4	4	-
B/H	2	-	-	1	1	1	3	1	1	-	9	-	1
B/H	1	4	2	1	4	4	2	1	4	3	3	6	-
B/H	-	1	1	2	1	1	3	1	2	1	8	2	-
G/A	-	-	-	-	1	-	2	-	-	3	9	-	1
G/A	1	1	-	1	-	-	3	1	-	2	7	1	-
B/A	2	2	-	1	2	2	1	1	1	2	7	-	1
B/A	1	2	-	1	1	1	4	1	1	-	6	1	-
B/A	2	2	-	2	2	2	3	.	1	-	7	-	1
G/L	1	-	-	1	1	1	2	-	-	4	6	-	1
G/L	2	-	-	-	1	-	3	-	-	2	7	-	2
G/L	-	-	-	-	1	1	4	-	-	2	8	-	2
B/L	-	-	-	-	-	-	3	-	-	1	8	-	-
Total	17	17	6	13	20	19	43	9	16	22	102	18	10

Note. EmoInf: Emotional Inference, SymUnd: Symbolic Understanding, CharDev: Character Development, Reflect: Reflection on Human Behavior, VisCues: Reading Visual Cues, ImgEmo: Linking Image and Emotions, FigLang: Figurative Language, Theme: Awareness of Core Theme, Moral: Moral Reflection, Misint: Misinterpretation, Explicit: Explicit Inference, Implicit: Implicit Inference, Don't know: Don't know Answers.

matters." These reflections show an understanding of central story ideas about greed, loneliness, and connection.

Moral. This category reflects explicit articulation of what lesson the character or reader may learn. Children shared analogies such as: "*Dierožrút was greedy and insatiable at first. When he ate the black hole, he realized that greed is a bad trait, that it's better to be modest, and that being greedy is not important at all.*" These statements go beyond theme to suggest normative judgments or guidance.

Misinterpretation. This includes responses that misunderstand a key element of the story, offer inaccurate inferences or pupils misunderstood metaphors or symbolic content. For example: "*That he is unconscious.*" This interpretation confuses the figurative meaning of "dumb as brick" (which typically refers to foolishness or lack of intelligence) with a literal state of unconsciousness, indicating an incorrect understanding of figurative language.

Explicit Interpretation. Pupils here merely list surface-level or literal traits. One child described the main character: "*He had a long nose, eyes, mouth, paws, ears, tail... kind of alien.*" This shows no deeper inference, focusing solely on observable characteristics.

Implicit Interpretation. This category reflects understanding that is not directly stated in the book but can be inferred through synthesis. One child explained the female character: "*Sometimes, what she had at hand was enough for her. [What was she like?] Whole. She was diligent, patient, and a thousand other things.*" The child links the character's traits to broader social commentary, demonstrating a higher level of abstraction and inference.

Don't Know. Lastly, this category includes pupils who were unsure or unable to provide a meaningful interpretation. One pupil simply answered: [*What did he realize at the end?*] "*I don't know.*"

4.2.1. Quantitative analysis: Descriptive statistics and Fisher's Exact Test

Descriptive statistics as shown in Table 13 revealed notable differences in interpretive response patterns between the experimental and control groups across several thematic categories. The experimental group outperformed the control group in areas such as *Character Development* ($M = 1.20$, $SD = 0.79$ vs. $M = 0.40$, $SD = 0.74$), *Reflection* ($M = 2.40$, $SD = 1.58$ vs. $M = 0.87$, $SD = 0.92$), and *Moral interpretation* ($M = 1.90$, $SD = 0.88$ vs. $M = 1.07$, $SD = 1.33$). Gains were also observed in *Theme* ($M = 1.00$, $SD = 0.47$ vs. $M = 0.60$, $SD = 0.83$) and *Visual Cues* ($M = 2.90$, $SD = 1.45$ vs. $M = 1.33$, $SD = 0.98$). In contrast, the *Misinterpretation* category was significantly lower in the experimental group ($M = 0.30$, $SD = 0.48$) compared to the control group ($M = 1.47$, $SD = 1.25$), suggesting improved accuracy in interpretation. Although the experimental group also showed higher means in *Symbolic Understanding* ($M = 2.40$ vs. 1.13), *Emotional Inference* ($M = 2.10$ vs. 1.13), and *Implicit Inference* ($M = 2.70$ vs. 1.20), the differences in these categories were somewhat more moderate. Overall, the descriptive data suggest that the intervention may have positively influenced children's visual literacy and depth of interpretation across multiple semiotic dimensions.

Statistical analysis using Fisher's exact test indicated that the differences between the experimental and control groups were statistically significant in five interpretive categories (see Table 14). These included *Character Development* ($p = .022$), *Reflection on Human Behavior* ($p = .030$), *Visual Cues* ($p = .037$), *Theme* ($p = .033$), and *Moral Reflection* ($p = .027$). These results suggest that the intervention had a measurable effect on children's ability to engage in deeper levels of interpretation. Additionally, the *Implicit* category approached significance ($p = .054$), indicating a potential trend toward improved inferential responses. Although other categories did not reach statistical significance, their descriptive differences, especially in *Misinterpretation* ($p = .107$), still suggest a meaningful contrast in response patterns between the groups.

Table 13
Descriptive statistics

Group		Emolnf	SymUnd	Explicit	Implicit	Don't Know	Mis Int	Moral	Theme	Fig Lang	ImgEmo	Vis Cues	Reflect	CharDev
N	E	10	10	10	10	10	10	10	10	10	10	10	10	10
	C	15	15	15	15	15	15	15	15	15	15	15	15	15
Mean	E	2.1	2.4	4.4	2.7	0.3	0.3	1.9	1.0	3.6	2.6	2.9	2.4	1.2
	C	1.13	1.13	6.8	1.2	0.667	1.47	1.07	0.6	2.87	1.27	1.33	0.867	0.4
Mode	E	2.00	2.00	3.00 ^a	2.00	0.00	0.00	2.00	1.00	4.00	2.00	3.00	2.00 ^a	1.00 ^a
	C	0.00 ^a	0.00	7.00 ^a	0.00	0.00	0.00 ^a	0.00	0.00	3.00	1.00	1.00	0.00 ^a	0.00
Sum	E	21	24	44	27	3	3	19	10	36	26	29	24	12
	C	17	17	102	18	10	22	16	9	43	19	20	13	6
SD	E	1.1	1.58	1.71	2.11	0.675	0.483	0.876	0.471	0.516	1.43	1.45	1.58	0.789
	C	0.99	1.19	1.74	1.93	0.724	1.25	1.33	0.828	0.834	1.16	0.976	0.915	0.737
Min	E	0	0	0	0	0	0	0	0	3	1	1	0	0
	C	0	0	0	0	0	0	0	0	1	0	0	0	0
Max	E	4	5	7	7	2	1	3	2	4	5	5	5	2
	C	3	4	9	6	2	4	4	3	4	4	4	3	2

Note. ^a More than one mode exists, only the first is reported, E: Experimental Group, C: Control Group, Emolnf: Emotional Inference, SymUnd: Symbolic Understanding, CharDev: Character Development, Reflect: Reflection on Human Behavior, VisCues: Reading Visual Cues, ImgEmo: Linking Image and Emotions, FigLang: Figurative Language, Theme: Awareness of Core Theme, Moral: Moral Reflection, Misint: Misinterpretation, Explicit: Explicit Inference, Implicit: Implicit Inference, Don't know: Don't know Answers.

Table 14
Fisher's exact test results

Category	Group		0	1	2	3	4	5	6	7	8	9	Total	p-value (Fisher test)
EmoInf	E		1	1	5	2	1	-	-	-	-	-	21	.311
	C		5	4	5	1	0	-	-	-	-	-	17	
SymUnd	E		1	2	3	1	2	1	-	-	-	-	24	.334
	C		6	3	5	0	1	0	-	-	-	-	17	
CharDev	E		2	4	4	-	-	-	-	-	-	-	12	.022
	C		11	2	2	-	-	-	-	-	-	-	6	
Reflect	E		2	0	3	3	1	1	-	-	-	-	24	.030
	C		6	6	2	1	0	0	-	-	-	-	13	
VisCues	E		0	2	2	3	1	2	-	-	-	-	29	.037
	C		2	8	4	0	1	0	-	-	-	-	20	
ImgEmo	E		0	2	4	2	0	2	-	-	-	-	26	.098
	C		4	6	3	1	1	0	-	-	-	-	19	
FigLang	E		0	0	0	4	6	-	-	-	-	-	36	.139
	C		-	1	3	8	3	-	-	-	-	-	43	
Theme	E		1	8	1	0	-	-	-	-	-	-	10	.033
	C		8	6	0	1	-	-	-	-	-	-	9	
Moral	E		1	1	6	2	0	-	-	-	-	-	19	.027
	C		7	4	1	2	1	-	-	-	-	-	16	
Misint	E		7	3	0	0	0	-	-	-	-	-	3	.107
	C		4	4	4	2	1	-	-	-	-	-	22	
Explicit	E		-	-	1	3	1	3	0	2	0	0	44	.126
	C		-	-	0	1	1	1	2	4	4	2	102	
Implicit	E		1	2	3	1	1	1	0	1	-	-	27	.054
	C		9	2	1	0	2	0	1	0	-	-	18	
Don't Know	E		8	1	1	-	-	-	-	-	-	-	3	.259
	C		7	6	2	-	-	-	-	-	-	-	10	

Note. E: Experimental Group, C: Control Group, EmoInf: Emotional Inference, SymUnd: Symbolic Understanding, CharDev: Character Development, Reflect: Reflection on Human Behavior, VisCues: Reading Visual Cues, ImgEmo: Linking Image and Emotions, FigLang: Figurative Language, Theme: Awareness of Core Theme, Moral: Moral Reflection, Misint: Misinterpretation, Explicit: Explicit Inference, Implicit: Implicit Inference, Don't know: Don't know Answers.

Together, the descriptive and inferential results support the effectiveness of the intervention in enhancing children's interpretive competencies, particularly in areas requiring deeper textual engagement such as reflection, theme, and moral interpretation. The categories where statistical significance was not observed may still reflect positive outcomes; for instance, *Misinterpretation* showed a clear drop in errors in the experimental group, though the difference did not reach significance, likely due to the limited sample size ($n = 25$). Similarly, areas such as *Implicit Inferences* and *Linking Image and Emotions* revealed promising trends. These findings highlight that while statistical power was constrained, the overall pattern of results aligns with the intervention's goals, and the descriptive improvements provide a strong rationale for further study with a larger sample.

4.2.2. Qualitative Analysis of Responses

The selected text *Dierožrút* and a subsequent individual semi-structured interview with nine open-ended questions served as a means of validating the picturebook intervention program. In the first two questions, pupils had to interpret peritextual elements in the individual semi-structured interview. Pupils in the experimental group were able to link what they saw with their own experience and to use both intertextual (Sipe, 2008) (pupils compared the book cover with some other show, e.g. *A fairy tale we saw on Netflix*, and also, *they (the characters) had like this vacuum cleaner, and they were eating socks*) and personal responses (Sipe, 2008) (pupils compared the character to their own previous experience). The answers from the control group were mostly explicit.

The occurrence analysis revealed that *Emotional Inferences*, *Symbolic Understanding*, *Implicit Inferences*, and *Reflection on Human Behavior* appeared much more frequently in the experimental group compared to the control group, where explicit and surface-level observations dominated. Descriptive statistics confirmed this trend: for example, in the category of *Emotional Inference*, the experimental group achieved a mean score of 2.10 ($SD = 1.10$), compared to only 1.13 ($SD = 0.99$) in the control group. Similarly, *Symbolic Understanding* showed a mean of 2.40 ($SD = 1.58$) in the experimental group, while the control group averaged 1.13 ($SD = 1.19$). These results indicate stronger inferential engagement among the pupils in the experimental group.

In the next three questions, we were interested in the characters' external and internal description. The description of the external characteristics of the literary characters in the experimental group was not only based on what was seen but also on linking the image to the textual component. The experimental group was not only focused on the external characteristics of the character but was also able to describe their internal traits, which was essential for understanding the meaning of the literary work; therefore, implicit connections were inferred. The occurrence analysis demonstrated that pupils in the experimental group frequently linked visual cues to emotions and inferred implicit traits through posture, color use, and spatial minimalism. Fisher's exact test confirmed statistically significant group differences in these areas: responses related to *Visual Cues* differed at $p = .037$. This reinforces that the experimental group demonstrated more frequent and meaningful attention to internal traits and symbolic emotional states conveyed visually.

The control group provided the answers based on the storyline and remembered information from the text; also, misinterpretation and "don't know" answers occurred. The experimental group was able to detect the positive character and compare it with the nonsensical behavior. Pupils were able to take a critical reflection on the character and respond and comment on his actions. Pupils from the experimental group were able to understand the character's journey as a metaphorical journey of life in which his transformation occurred (e.g., *At the beginning he was stingy, at the end he was a bit more modest.*). Thus, they did not only perceive the character in a negative sense but also pointed to his inner, positive change. In the control group, the interpretation of the character was in relation to its explicit description in the text. Elicitation of implicit information occurred sporadically and only with the pupils with higher levels of reading comprehension (category

Implicit). Fisher's test also indicated a significant group difference in the *Character Development* category ($p = .022$), further supporting that the experimental group was better at inferring personal growth and psychological depth.

In the sixth question, we observed the pupils' ability to infer the color symbolism in the image. Pupils in the experimental group were able to detect and decipher pictorial metaphors (e.g., *wells, not only as a source of water but also as a metaphor for life itself*). In decoding emotions through color, they associated black with a deadlocked situation in which the character was reassessing his behavior, a situation in which self-reflection and its subsequent turn for the better occurred. In deciphering the meaning of the emotion through the character's location in space, they associated the turn of the character to be better with the nothingness he must have experienced. The nothingness itself and the figure in the minimalist representation (*on the edge of the cliff, the so-called 'end of the world'*), created images for the pupils of loneliness, smallness, numbness, and a longing for the presence of another person (e.g., *Like he was scared and sad. Like he's missing something even at the end of the world.*).

In this study, the utilization of emotional inference, the establishment of a link between image and emotions, symbolic understanding, and implicit inferences were observed to be particularly prevalent among pupils in the experimental group. Although Fisher's test results for *Emotional Inference* ($p = .311$), *Symbolic Understanding* ($p = .334$), and *Linking Image and Emotion* association ($p = .098$) did not reach statistical significance, the descriptive differences were substantial and pedagogically meaningful. In the control group, emotional interpretation based on spatial composition was rarely observed, with literal interpretations of visual elements predominating.

In revealing the meaning of emotions through figurative elements in the seventh question, the pupils in the experimental group were able to decode the deformed body of the character as a consequence of its greed and the feeling of emptiness. In the last two questions, we observed the pupils' ability to recognize the fictional reference to the real world and connect characters' actions with real-life experiences. Pupils in the experimental group were able to connect the fictional realm with the real world and thus take their own stance on the problems of the contemporary world – hoarding, greed, and avarice. The experimental group demonstrated a higher level of engagement with reflection on human behavior and moral reflection, exhibiting more consistent and spontaneous behavior in this regard. This difference was statistically supported in the *Moral Reflection* category ($p = .027$), affirming the experimental group's stronger tendency to generalize textual meaning to universal values and ethical reasoning.

In contrast, the control group exhibited a more sporadic approach to these reflections, often requiring external encouragement to participate. The pupils' level of understanding of the text in terms of mental representation in the form of a situational model (Kintsch & Van Dijk, 1978) was thus revealed. In this case, the pupils in the experimental group were able to go beyond the text in their comprehension and relate what they read to their own experiences, interests, and ideas (e.g., *I would compare him rather to an animal because he is greedy... We humans also chase after money, luxury... The important thing is to have a family, to be happy and healthy.*). Pupils in the experimental group tended to connect the end of the story, i.e., the return of the character to his spouse, as a way of understanding the need for universal human values (the need for love, family, friendship, work, diligence, etc.) and therefore they were aware of the core theme of the story. This finding is supported by a significant difference between the groups in the *Theme* category ($p = .033$), with the experimental group demonstrating greater thematic awareness.

Finally, they were able to fill the absent experience in reading and interpreting visual analogies. This was evident in both the experimental and control groups (category *Figurative Language*). The rigorous description and interpretation of the illustrations and the fluent guidance of the pupils to the meaning of the idioms and phraseologies (*"dumb as a brick", "heart of stone", "penny-pincher", and "memory like a sieve"*) proved to be an appropriate procedure to clarify them.

In choosing this more challenging picturebook, we were concerned about whether pupils would be competent enough to decipher its multilevel nature. However, pupils in the

experimental group were encouraged to interpret the text in combination with the image more accurately and richly, which resulted in the formation of more complex mental models. These results are even more significant when viewed alongside descriptive statistical indicators. While the experimental group ($n = 10$) included pupils with varying levels of reading imagination and comprehension, they still demonstrated higher average scores across key interpretive categories such as *Emotional Inference* ($M = 2.10$), *Symbolic Understanding* ($M = 2.40$), and *Reflection on Human Behavior* ($M = 2.40$), compared to lower means in the control group ($n = 15$) across the same categories ($M = 1.13$, $M = 1.13$, and $M = 0.87$, respectively). The experimental group showed a significantly higher incidence of emotional, symbolic and implicit reasoning, while the control group's responses were dominated by explicit observations, misinterpretations and 'don't know' responses. These patterns correspond to both the descriptive and inferential statistical results, visually reinforcing the overall effectiveness of the picturebook intervention program in promoting deeper and more inferential comprehension in the experimental group.

5. Discussion

The importance of the combination of verbal and visual cognition for text comprehension has been described by psychologists, e.g., Sadoski and Paivio (2013) in the form of the dual coding theory, which we have relied on in our research. At the same time, we drew on the theory of the situational model (Kintsch & Van Dijk 1978), which goes beyond what is read or assumes a level of understanding of the text based on the individual, subjective experience of the reader. The present findings are consistent with those of Níkleva and Rodríguez-Muñoz (2022), who conducted a quasi-experimental longitudinal study involving over 200 pupils in Spain. The findings of the study demonstrated that the implementation of a structured visual literacy program resulted in a substantial enhancement in reading comprehension at both the literal and inferential levels. This improvement was particularly evident in the interpretation of symbolic and connotative images. Our conclusions are also in line with the work of Chen and Huang (2023), who emphasize that picturebooks contribute not only to word and concept acquisition but also to analogical reasoning, symbolic development, and cognitive transfer. Their research highlights the dual role of picturebooks in scaffolding conceptual learning and social understanding, which parallels our findings regarding inferential and emotional comprehension. Similarly, Breittfeld et al. (2021) demonstrated that children simultaneously extract moral, linguistic, and narrative meanings from picturebooks during shared reading, supporting our assumption that picturebooks allow for complex meaning construction across verbal and visual modalities. The findings of Chen et al. (2023) also support the idea that socially themed picturebooks significantly enhance prosocial behavior, mediated by empathy, a pattern evident in our study as well, particularly in emotional inference and reflection categories. In addition, Hartati et al. (2025) found that sociocultural-based reflective picturebook media significantly improved children's social skills and reading interest, reinforcing the notion that well-structured multimodal content can foster engagement and deeper interpretive responses. These findings align with existing research that highlights the effectiveness of picturebooks as pedagogical tools to enhance reading comprehension and interpretive skills. For instance, Gunawan and Suhardi (2019) developed a thematic-integrative picturebook and found a significant improvement in 4th-grade pupils' reading comprehension scores after the intervention, demonstrating that picturebooks designed with educational intent can positively influence comprehension outcomes. Similarly, Suryaningsih et al. (2024) reported that a specially designed picture storybook improved pupils' reading comprehension. Their study confirmed high levels of acceptance from both teachers and pupils and validated the material as highly effective learning media. These results mirror the effectiveness observed in our own intervention, where pupils in the experimental group demonstrated stronger performance in categories such as emotional inference, symbolic understanding, and reflection. The educational use of multimodal texts is further supported by Pantaleo's (2021) classroom-based research, which emphasized how intentionally guided work with allegorical picturebooks developed students' visual reading skills

and deepened their critical engagement with multimodal ensembles. The capacity of young learners to interpret color, typography, and perspective in visual narratives, as shown in Pantaleo's study, resonates with our findings on the children's ability to identify symbolic meanings and complex emotional cues in the picturebooks used in our intervention.

Together, these studies strengthen the argument that multimodal and thematic picturebooks, when used in well-structured intervention programs, can significantly enhance pupils' comprehension, inferential reasoning, and visual literacy, especially when scaffolded by reflective and dialogic approaches to reading. Similar to their conclusions, our quasi-experimental mixed-methods study also demonstrated that integrating picturebooks, where verbal and visual elements work synergistically, can enhance pupils' ability to understand text, make inferences, and connect emotionally and cognitively with narratives. This is supported by the descriptive statistical results, which showed a greater frequency of more complex inferential categories, especially emotional and symbolic inferences, in the experimental group compared to the control group. Furthermore, the Fisher's exact test confirmed statistically significant differences in 5 out of the 13 evaluated categories, with the overall trend favoring the intervention group. Although our sample was smaller and the design intentionally selected and exploratory, the outcomes similarly suggest that the intentional use of visual materials contributes meaningfully to the development of deeper text comprehension skills.

The results shed light on an in-depth understanding of the problem, the phenomenon of the reception of picturebooks by children of younger school age, however, there are some issues that could be taken into account when interpreting our findings. The findings cannot be generalized to the general population, or, in terms of ecological validity (Gavora, 2010), the results of the research cannot be generalized to other cases. In particular, the use of a small, non-random sample and the exploratory nature of the design limits the extent to which the findings can be transferred to other educational settings. Moreover, the selection of participants from a single educational establishment or geographical area may result in the introduction of sampling bias, thereby further reducing the generalizability of the study's findings. While our findings provide valuable insights, they are limited in their generalizability due to the sample size and methodological constraints. Nevertheless, mixed-methods research offers a rich, contextualized understanding that is particularly valuable when exploring complex educational phenomena such as picturebook interpretation. Another limit of this study is that thematic coding and category assignment were carried out by a single researcher. Although we applied a consistent coding scheme across all responses, the lack of intercoder reliability testing may introduce subjectivity or potential bias into the categorization process. Future studies should consider involving multiple coders and calculating intercoder agreement (e.g., using Cohen's kappa) to strengthen the reliability and validity of the coding framework. Additionally, given the near-significant results in some categories, future studies with larger samples could potentially yield stronger statistical significance, supporting the trends observed in our exploratory findings. Subsequent research might also incorporate a measure of different learning styles [VARK] to examine how sensory preferences shape children's engagement with picturebooks. Since picturebooks rely on a multimodal interplay of text and image, children with a strong visual preference may naturally engage with illustrations, while auditory learners might benefit from read-aloud sessions. Understanding these preferences could help tailor activities, such as guided discussions for verbal learners, dramatization for kinesthetic learners, or annotation exercises for reading/writing learners, to enhance comprehension and interpretation. Additional research might also conduct long-term studies to observe the sustained impact of picturebook-based interventions on children's reading and interpretation development. Incorporating pre- and post-intervention testing may provide a more comprehensive evaluation of the effectiveness of picturebook-based programs over time. Further research might also explore the comparative statistical analysis of Sheveland's (1992) and Boerma's (2016) questionnaires to examine correlations between pupils' visual imagery vividness, reading imagination, and comprehension outcomes. This could provide additional

insights into how different cognitive and reading profiles influence the reception of multimodal texts.

From a practical perspective, the findings of this study propose numerous methodologies through which picturebooks might be more methodically incorporated into the school curriculum. It is recommended that educators consider incorporating high-quality picturebooks into reading lessons, with a view to supporting not only language development but also visual literacy, empathy, and inferential thinking. The development of thematic units by curriculum designers, based on multimodal picturebooks, has the potential to encourage teachers to utilize these texts for discussion, creative response, and cross-curricular links (e.g., visual arts, ethics, or environmental education). It is recommended that policymakers consider allocating funding to teacher training programs that focus on the utilization of picturebooks as educational tools, with a particular emphasis on their application in early literacy instruction.

In the research, we have mainly inclined to a didactic approach which through dialogue seeks a thorough understanding of the text and creates a relaxed atmosphere for the expression of one's own ideas. The didactic approach, which combined structured guidance with a phenomenological perspective, allowed pupils to explore both cognitive and emotional dimensions of picturebook interpretation. Cognitively, pupils developed analytical skills by identifying visual metaphors, recognizing text-image relationships, and drawing inferences. Additionally, the open-ended discussions created a space for personal reflection, allowing pupils to connect the story to their own experiences, fostering empathy and imaginative engagement.

Our research underscores the potential of employing picturebooks in the education of younger school age children. Through our investigation, we've solidified the positive impact of high-quality picturebooks on a child's comprehension and interpretation skills. Following the picturebook interventions, pupils demonstrated marked progress in basic image interpretation skills, evident through more profound insights shared during interviews. Hence, we emphasize the importance of addressing the interpretation of visual images, which significantly broadens a child's reception and interpretation. Engaging with visuals promotes the cultivation of new knowledge and fosters imaginative thinking.

6. Recommendations for practice

Based on the results of our research, we propose several recommendations for primary school teachers to support pupils' comprehension and interpretation skills through the use of picturebooks. Teachers should expand the basic set of literary texts by integrating high-quality picturebooks that not only stimulate pupils' aesthetic perception but also foster critical thinking and moral reflection. Such texts serve as gateways to multi-layered interpretation and support the development of deeper mental models through the interplay of visual and verbal modes. Selecting picturebooks that explore complex, meaningful, and existential themes—such as loneliness, transformation, empathy, or ethical dilemmas—provides cognitive scaffolding that helps pupils infer implicit meanings. This, in turn, enhances their depth of interpretation, particularly for less proficient readers.

In the classroom, pupils should be engaged in focused discussions about the visual images in picturebooks, where they are encouraged to search for hidden meanings and symbolism. This practice develops visual literacy and interpretive competence, as children learn to uncover visual metaphors, decode emotional cues, and attribute psychological depth to characters through pictorial elements such as posture, space, and color. Teachers are also encouraged to adopt dialogic reading practices, creating an open and imaginative classroom environment in which pupils feel safe to express personal interpretations, make associations, and engage in philosophical or emotional reflection. Such dialogic spaces have proven essential for guiding learners toward moral insights and critical commentary.

Going beyond superficial understanding or memorization, teachers should create opportunities for pupils to engage in higher-order thinking skills such as analysis, abstraction, comparison,

interpretation, and evaluation. These skills help construct complex situational models and enable children to interpret texts more independently and creatively. Incorporating different types of text-image relationships (e.g., contradictory, complementary, symmetrical) also allows teachers to accommodate diverse reading abilities. Picturebooks that balance textual simplicity with visual complexity ensure that all learners, including those with lower reading comprehension or visual acuity, can access deeper meaning and engage meaningfully in interpretive processes.

Finally, pupils should be guided to connect fictional narratives with their own life experiences. By comparing the emotions and actions of literary characters with their personal realities, children can develop intertextual and empathetic responses. This not only strengthens reading comprehension but also promotes theory of mind and emotional intelligence, as evidenced by pupils' spontaneous references to family, moral, and social issues in the experimental group. Beyond the classroom, future teachers, education students, and youth workers should also be educated about the pedagogical value of picturebooks. Despite their minimalist form, picturebooks are capable of conveying deep and complex meanings. Overcoming the misconception that they are merely "simple texts" is essential, as these works, when used critically and creatively, can foster aesthetic appreciation, ethical reflection, and multimodal literacy in young readers.

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Data availability: The data analysed during the current study are available from the author.

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