



The drawings children draw after hearing the story of the bee (*Apis africana*). (Case Study)

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To cite this article:

Amauri Betini Bartoszeck. “The drawings children draw after hearing the story of the bee (*Apis africana*). (Case Study)”, *Parana Journal of Science and Education*. Vol. 11, No. 4, **2025**, pp. 42-48.

Received: April 19, 2025; **Accepted:** July 28, 2025; **Published:** August 1, 2025.

Abstract

Thirty-three spontaneous drawings were collected from pupils enrolled in a pre-school at the city of Curitiba, Parana State, Brazil after the researcher turned and shown the pages of a booklet telling the story of the bee. Later the drawings were analyzed considering sex of pupils, morphological structure of the bee, mention of a beehive, plants Sun and if the pupil drew himself at the scene. The pupils by means of their drawings have shown a basic knowledge what is a bee and how it lives in the environment.

Keywords: pre-school, bees, students, drawings, southern Brazil.

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1. Introduction

Pupils around the world of the world, more in the tropical warmer regions, not really in UK where bees and wasps are more common, are familiar with mosquitoes that feed on human blood causing diseases and butterflies and moths (caterpillars) which attack food crops but have wonderful colour wings ([01] Bartoszeck & Tunncliffe, 2018) and some beetles which act as soil fertilizers ([02] Twist, 2006). Insect can engender feelings of disgust and fear. Understanding insects can affect children's understanding and attitudes to biodiversity and pest control. Understanding insects and bee hives and pollination of food crops and insect pests being killed by certain pesticides.

2. Theoretical Background?

Children enrolled in preschool in Southern Brazil have a basic knowledge of insects whether they see them in the garden of the house, orchard, or school backyard or neighbourhoods where they live or through the media, videos, pictorial fiction books for early learners such as ([03] Narchi, 1977; [04]Kingsley, 1999; [05]Rabe, 1999; [06] Zahadnik & Chvála, 2009; [07] Raffles, 2010; [08] Bartoszeck & Bartoszeck, 2012). The progressive urbanization of the environment where children live has kept the children from the natural world and have fewer opportunities to play outside in streets where they live and interact with living organisms such as the ants and bees ([09] Abramson & Aquino, 2002; [10] Bartoszeck et al., 2019).

3. Methodology

The first author visited a pre-school and asked the head and school pedagogical coordinator to send a consent term to be signed by parents before collecting drawings and what children said about insects, where they find them. After that, the first author turned the pages and read the booklet "A abelha" (page 5) showing the pictures and asking the children to pay attention. At the end children were asked to draw a picture on a A4 sheet of paper what they remember about the story.

4. Findings

These are what children said what they know about insects and what they remember after they heard about the story.

- I. Danielle, 5 years old (from school at a church near home, November '24).

The bee makes honey, but may sting Fernando's hand (one of the characters from the story)

- II. Manuela, 4 years old (from the same school above).

Bees can sting, they carry on the legs a powder like sand.

- III. Luna, 5 years old said that the boy Fernando went to visit his granddaughter's farm and the bee was making honey, it has 2 wings.

- IV. João, 5 years old, said that the bee collects honey from a flower and he enjoys the story.

- V. Maria Julia, 4 years old, said that Fernando was fetching honey to bring to his granddaughter and was stung by the bees.

- VI. Luiz Miguel, 4 years old said that the boy from the story (Fernando) went to bring honey from the beehive for his granddaughter to make honey-cake and the bee was angry and stung his hand.

- VII. Lena, 5 years old said that the granddaughter lives in a town, and the boy from the story eats honey on the bread. Bees make honey, they collect nectar from flowers, she enjoyed the story.

Note: These above are what children said on May 2022.

What they know about a bee: (September, 2024).

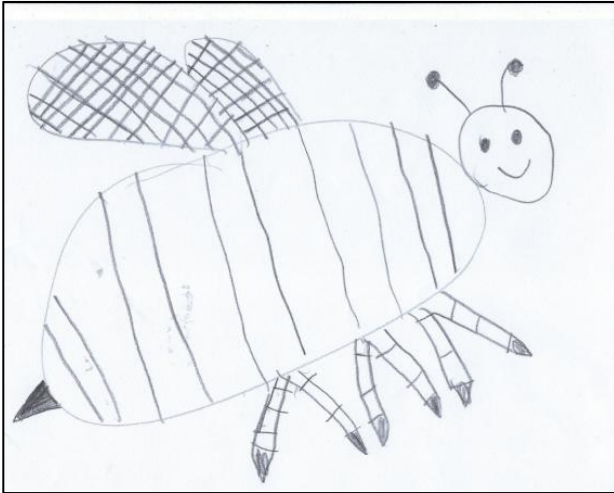
- VIII. Boy, 9 years old at a Club Library:

the bee is a bug that flies. It has stripes yellow and black. It has a sting. I saw them in many places when I was traveling with my parents and studied at school.

His Picture below:

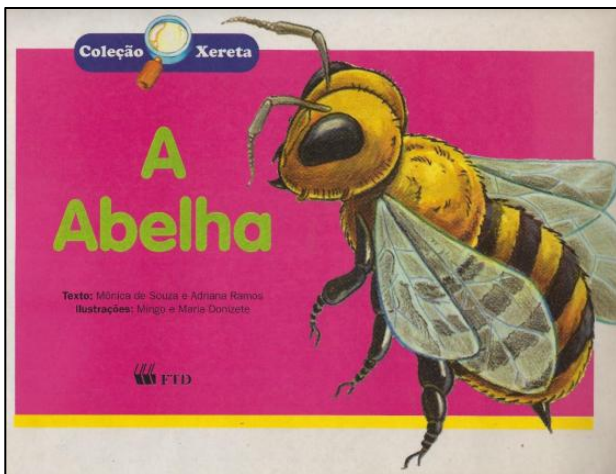


Figure 1: Drawing from a boy 9 years old.



Source: Children of research.

Figure 2: Drawing from a boy 9 years old.



Source: The book which the first author turned the pages and read aloud.

After I read the story and turn the pages, what he told me about it:

The boy (who is visiting the granddaughter) said that the boy from the story, loved to eat honey. He asked her how is the honey made? She said that bees take a little powder from flowers. The boy was intrigued and went to the farm garden to watch what happens in a flower.

He observed that bees took the powder and some of it fell to the ground.

He got interested and asked his grandmother that he saw the powder but not the liquid. Thus, grandmother said that bees collect nectar from inside the flower and take to the beehive.

Bees produce its own liquid and a liquid from the flowers and take it to the beehive.

The boy went to the garden and was afraid to get closer to the beehive.

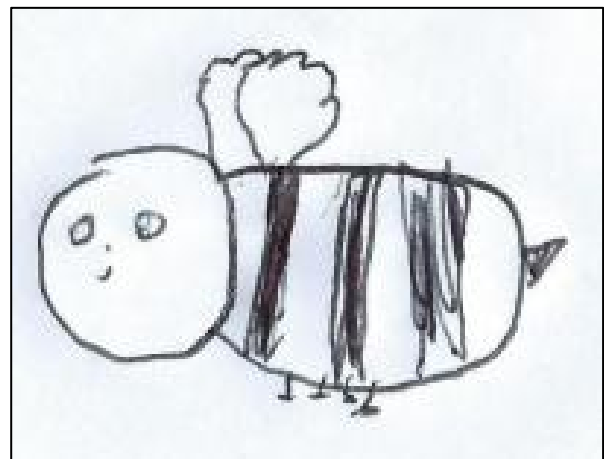
He told that bee carry the little powder they collect from flowers at their legs.

The granddaughter said that bees use their tongues to fetch for the liquid, which they take to the beehive and mixture with the liquid which the bees themselves produce to elaborate honey. The larvae (baby bees) eat the pollen which adult bees brought.

IX. Report from a girl, 7 years old:

- I know what a bee is, it is a bug. It lives everywhere in gardens and makes honey.

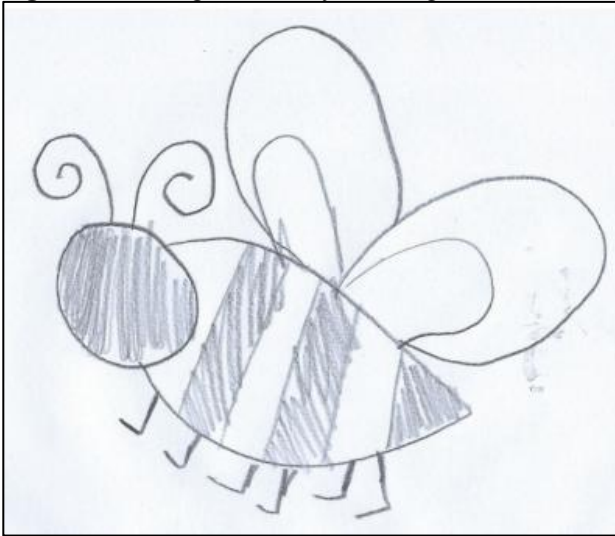
Figure 3: Drawing from a girl 7 years old.



Source: Children of research. **Note:** This girl as we are at the Curitiba Club, did not want to listen the story and tell back. So this is her drawing from memory.



Figure 4: Drawing from a 11 years old girl.



Source: Children of research.

5. Results

Thirty-three drawings of the scenes were collected after reading the story.

X. Report from a girl, 11 years old:

I see bees at home at our garden. I also see these bees in boxes at city parks, but they are stingless.

I saw bees with sting at the playground where I live with my parents in a house.

The bee is an invertebrate animal , or an insect.

Figure 4: Drawing from a girl 6 years old where she represents a beehive, the bee with a pair of wings and a pair of legs. Four flowers with butterflies on a shrub, herself and the Sun.



Source: Children of research.

After I read the story what she told me about it:

It is the story of a boy who enjoyed having morning coffee at his granddaughter farm. She puts honey on the top of a slice of bread and he eats with pleasure.

The boy was surprised how bees which are so small are able to make honey! His granddaughter said that the bees make that.

Figure 5: Drawing from a boy 5 years old where he represents himself and a group of other people and a bee with antennae, wings and legs.



Source: Children of research.






Figure 6: Drawing from a girl 4 years old with an artistic representation of a bee, a beehive and some flowers.



Source: Children of research.



Table 1. Elements found on the drawings from bee scene.

N	sex	age	bee	beehive					flowers	Sun		Person	No*
1	F	6	1	1	1	2	1	1	4	1	0	1	0
2	F	7	1	0	1	2	0	0	0	0	0	0	0
3	M	5	1	0	0	0	0	0	0	0	0	4	0
4	M	5	1	0	0	0	0	0	0	0	0	0	0
5	M	4	1	1	1	0	0	0	3	0	0	1	0
6	F	4	1	0	1	2	0	0	4	0	1	0	0
7	M	4	0	0	0	0	0	0	3	0	0	0	0
8	M	4	0	0	0	0	0	0	0	0	0	0	1
9	F	5	0	1	0	0	0	0	0	1	1	0	1
10	M	5	1	1	0	3	1	1	3	1	1	0	0
11	M	5	1	0	0	0	1	0	7	1	1	0	0
12	F	5	7	1	1	0	1	0	3	1	1	0	0
13	M	6	1	0	1	0	1	0	3	1	1	0	0
14	F	6	1	1	0	1	1	1	0	1	1	3	0
15	M	6	1	1	1	0	1	1	3	1	1	0	0
16	M	5	0	0	0	0	0	0	0	0	0	0	1
17	F	6	1	0	0	0	0	0	0	0	0	0	1
18	F	5	2	0	1	0	1	0	2	0	0	1	0
19	M	5	1	1	1	0	1	0	0	1	0	1	0
20	F	6	6	1	1	0	0	0	3	0	0	0	0
21	F	6	1	1	1	2	1	0	2	0	1	0	0
22	F	5	1	1	2	0	1	0	2	1	1	0	0
23	M	4	1	0	1	0	1	0	0	0	0	0	0
24	M	5	1	1	0	1	0	0	0	0	1	0	0
25	M	4	0	0	0	0	0	0	2	1	1	0	0
26	M	4	1	0	1	1	1	1	0	2	1	1	0
27	F	5	1	1	2	3	1	0	3	1	1	1	0
28	F	5	1	0	0	0	1	0	1	1	0	0	0
29	M	4	0	0	0	0	0	0	0	1	1	0	0
30	F	4	1	1	1	0	1	0	0	0	1	0	0
31	F	11	1	0	2	3	1	0	0	0	0	0	0
32	M	9	1	0	1	3	1	0	0	0	0	0	0
33	F	4	2	1	1	0	1	0	4	0	1	0	0






Source: Authors. **Note:**  = pair of wings;  = Pair of legs;  = pair of antennas;  = tree with butterflies;  = Clouds; No* = not recognize.



Figure 7: Drawing from a 6 years old boy representing his view of a bee, flowers, the beehive and a house.



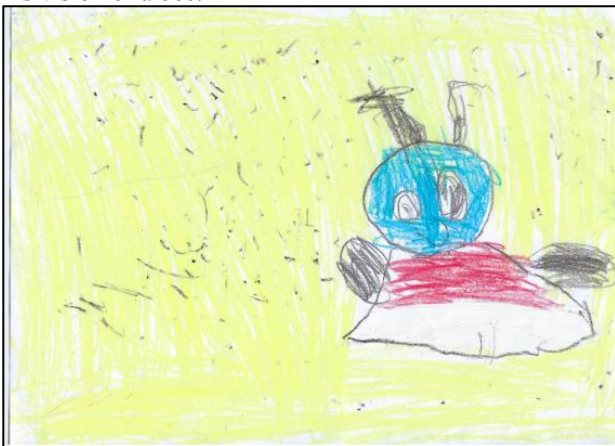
Source: Children of research.

Figure 8: Drawing from a 6 years old girl representing flying bees, a tree, the Sun, clouds and herself and friends.



Source: Children of research.

Figure 9: Drawing from a 4 years old boy representing his vision of a bee.



Source: Children of research.

Discussions and Conclusions

When the researcher inquires of a pupil about a scientific fact, the child may respond by a “mental representation”. It can be by a drawing which reflects a “mental model” which manifests itself as an “express model” as for example a drawing, considering many pupils have difficulties to explain in their own words or by gestures thru play ([11] Tunnicliffe and Gkouskou, 2019). The mental model is formed into the cognitive structure of the mind ([12] Borges, 1999; [13] Kosslyn & Miller, 2015; [14] Vincent, 2016). When a child sleeps and dreams the NREM kind of sleep help transfer the information recently acquired to safe spots in the brain developing imagination and creativity ([15] Judson, 2010; [16] Walker, 2018).

Most of the drawings drawn represented themselves, plants and the Sun as previous published ([17] Tamir and Zohar, 1991; [18] Ferreira, 2003; [19] Villarroel, 2016; [20] Villorroel and Villanueva, 2017). Most of the drawings indicated that these pupils have an idea of the morphology of the insects and that they live in an environment with plants and the Sun and a chain of living organisms (Table 1).

The data obtained in the exploratory study may allow the planning of practical classes in pre-schools and other field experiments involving observing bumblebees in transparent boxes ([21] Sieg and Dreesmann, 2024). Visits to botanical gardens and collect and pin insects at the bottom of shirt boxes may be an educative activity by itself.

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