

Appendix A

This appendix contains excerpts taken from three interviews about the Earth's shape and the day-night cycle, conducted by the first author of this study and a postgraduate student with two village chiefs (first, a 90-year-old Mossi chief, and second, a 60-year-old Bissa chief) and a storyteller aged 30-40 years. A tale is also transcribed.

Extracts from interviews

Question about the Earth's shape (What shape is the Earth?)

According to the storyteller, the Earth has no specific shape, it is here below our feet and if you dig, it is still Earth. As the Earth does not turn people's heads, it is stable and does not turn. According to first chief, the Earth's shape cannot be explained, it just *is*, in the same way that people speak different languages. For the second chief too, the Earth is not round but like fields, and as such belongs to some persons. In fact, it has no specific shape.

Question about where the Earth ends (Does the Earth have an end?)

For the storyteller, the Earth is surrounded by ocean, you can see it from Ivory Coast (where he was born) with the sky touching the Earth. The Earth finishes where it meets the sky, even if nobody has been there. According to him, people think of the sky as a huge tarpaulin that covers the Earth, is above our heads and joins the Earth at the skyline. For the first chief, we cannot know if the Earth has an end, because when you move from one place to another and from one point to another point, you never come to the end. For the second chief, the Earth ends where the ocean begins.

Question about the origin of the Earth (How was the Earth made?)

The storyteller replied that the Earth was made by God, just as humans were, in accordance with Mossi beliefs. For the first chief, he cannot know, as he was not there at the beginning. Moreover, he did not know his great grandfathers (who might know). For the second chief, God made the Earth and Adam and Eve were the first inhabitants.

Question about the day-night cycle (How do day and night happen?)

According to the storyteller, people usually believe that the Sun is there to light up the day and the Moon is there to signify that the working day is over. People believe that the Sun burns and moves: in the morning it rises, moves above our heads and around six o'clock falls down. (The Moon does the same at night.) Moreover, the Sun and Moon move around the Earth in the same orbit, but on opposite sides. The first chief provided a description of the Sun's daily course, and explained that we cannot know where it is at night. For him, only the Sun and the Moon, which are friends, know what they do. He explained that he did not know because he is not one of their friends. According to the second chief, God made day and night, how He did, he does not know, but days are for working and nights are for resting.

Tale

We also collected three tales about humans and the Earth, Sun and Moon from two storytellers (S-T), whom the first author of this study and a postgraduate student (V&L) met in Ouagadougou. One tale about the day-night cycle and the organization of the Earth, Sun and Moon seemed particularly interesting. Here is the transcription of that tale.

“*Storyteller starts to sing

In my village, we are used to telling stories, but before we tell a story, there is a magic form! When the storyteller say “Story”, everyone listening replies “Tale”. Shall we try?

- S-T: Story
- V&L: Tale [laughter]

Straightaway, the storyteller says “I want to tell you a story”, everyone listening replies “It’s a lie”, then the storyteller says, “Hmmm... I know”, and everyone listening replies “Tell it to us anyway”. Shall we try?

- S-T: I want to tell you a story
- V&L: It’s a lie!
- S-T: Hmmm, I know
- V&L: Tell it to us anyway!
- S-T: Story!
- V&L: Tell us!
- S-T: Story!
- V&L: Tell us!

In the olden days, Impe the Moon and Daougo the Sun were a married couple living on Earth. Then Impe the Moon and Daougo the Sun had several children. They had several children who were cocks, and they also had children who were stars. One day, Impe the Moon was doing the housework when Daougo the Sun left to till the fields.

*Storyteller starts to sing

- S-T: Story
- V&L: Tell us!
- S-T: I want to tell you a story
- V&L: Tell us
- S-T: It’s a lie! [Laughter]
- V&L: It’s a lie! [Laughter]
- S-T: Hmmm, I know!
- V&L: Tell it to us anyway!
- S-T: We do it again! Story!
- V&L: Tell us!
- S-T: I want to tell you a story!
- V&L: It’s a lie!
- S-T: Hmmm, I know!
- V&L: Tell it to us anyway!

One day, Daougo went off to till the fields and Impe the Moon stayed at home to do the housework. And the cocks and stars helped her with the housework. But I didn’t tell you that some of the cocks and stars didn’t like working and preferred to spend all their time outside having fun... While they were playing in the dust... Story!

- V&L: Tell us!
- S-T: I want to tell you a story
- V&L: It’s a lie!
- S-T: Hmmm, I know!

- V&L: Tell it to us anyway!

While they were playing in the dust, the cocks and stars started to hit each other. We don't know why. They hit each other for a long time. Finally, Impe their mother went out and separated them. To punish the stars, as they claimed that the cocks were right, she starved them. Daougo the Sun arrived home at dusk to find the stars, his children, hungry and thirsty, and locked in a hut. I want to tell a story!

- V&L: Tell us!
- S-T: I want to tell you a story
- V&L: It's a lie!
- S-T: Hmmm, I know!
- V&L: Tell it to us anyway!

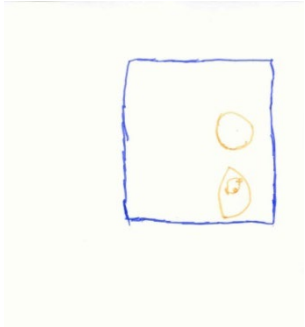
Furious, he summoned his wife Impe the Moon: "Impe the Moon, come and tell me why my children, the stars, are shut up in the hut without any food or water." Then Impe the Moon came and started to explain, "Ah! You know, beloved, the stars provoked the cocks and the cocks hit them, and then I punished them." And Daougo the Sun said, "Then, like all good mothers, when your children squabble, they all have to be punished. Or else you call them together and give them advice. You can't punish the stars and let the cocks go free. It's only because you love the cocks more than the stars". "That's not so!" answered the Moon. "Yes it is..." said the Sun. Then Daougo the Sun got angry! He went up into the sky and took the stars with him, leaving the cocks on Earth with the Moon. He told her that "From this day on, you had better not cross my path, otherwise you will see what I am made of!" And from that day to this, the Moon has appeared only at night, to avoid meeting the Sun, and the Sun has appeared only during the day. Each time the day draws near, the cocks sing to warn their mother that she risks encountering their father if she does not leave the path she is on. Meanwhile, the stars stay out and shine at night to show their father that they are watching to make sure that their mother does not come and hurt him. The storyteller starts to sing.

- S-T: Story
- V&L: Tell us!
- S-T: I want to tell you a story
- V&L: Tell us
- S-T: I've got no more story to tell!
- V&L: [Laughter]

Appendix B

Examples of children's productions representing the Earth's shape

Circular and rectangular flat Earths



Grade Three (2D)

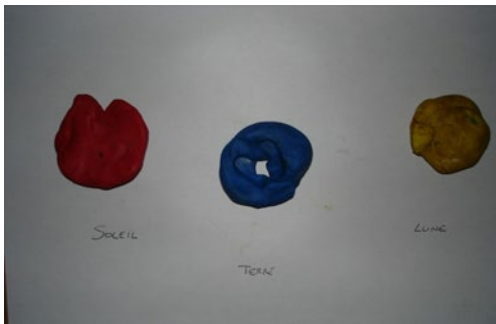


Grade One (3D)



Grade Three (3D)

Ring-shaped Earths

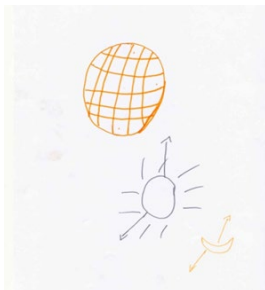


Grade One (3D)



Grade Eight (3D)

Spherical Earths



Grade Five (2D)



Grade Five (3D)



Grade Eight (3D)

Appendix C

Children's patterns description for each cluster

Earth shape

Fadi, a fifth grader aged 12 years and 8 months, was one of the most representative child of the first cluster (EC1) (distance from cluster center: 0.759). She answered that the Earth is flat (Q1), but did not manage to say exactly what it looks like (Q2). She drew a circle to represent it (Q3; see Figure C1a). She explained that the sky is above the Earth (Q4). She was not asked the question about local and global perspectives (Q5), as she had initially alluded to the flattened shape of the Earth.

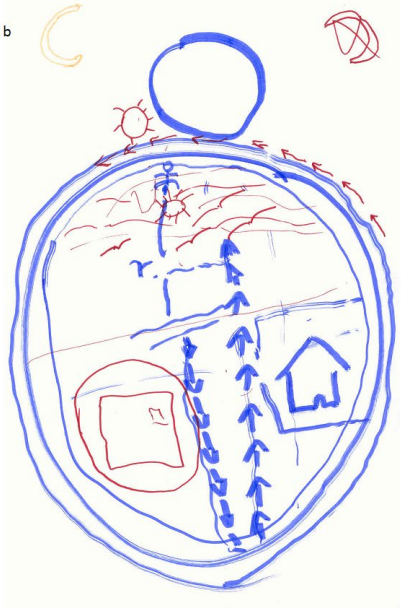
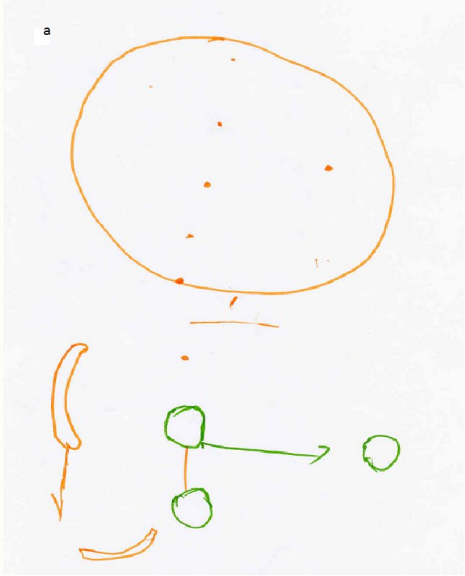
Jul, an eighth grader aged 15 years and 1 month, was one of the most representative children of the second cluster (EC2) (distance from cluster center: 0.435). He answered that the Earth is round (Q1) like a ball (Q2), that is, a spherical object. He drew a circle to represent the Earth's shape (Q3; see Figure C1b), and said that the sky is above the Earth (Q4). Jul did not manage to explain why the Earth looked flat in a photograph when he had previously said that it was round like a ball (Q5).

Day-night cycle

Naim, a first grader aged 6 years and 7 months, was one of the most representative children of the first cluster (DNC1) (distance from cluster center: 0.291). She said, as expected, that when the Sun shines on one side of the Earth, it is night on the other side (Q6), but failed to say that it is day on the sunny side (Q7). (It should be noted that she made a pancake out of playdough to represent the Earth in Q3.) To explain the day-night cycle, she invoked the movement of the Sun, the Moon or the clouds (Q8). According to Naim, the Sun moves from the right side of the sky to the left side to make days and nights (Q9), and the Earth stays still (Q10).

Hali, a fifth grader aged 14 years, was the most representative child of the second cluster (DNC2) (distance from cluster center: 0.774). He correctly answered that when the Sun shines on one side of the Earth, it is night on the other side, and vice versa (Q6 and Q7). To explain the day-night cycle, Hali stated that the "Earth rotates on its axis every 24 hours" (Q8, Q10), in addition to the Sun moving "step by step from East to West" (Q9).

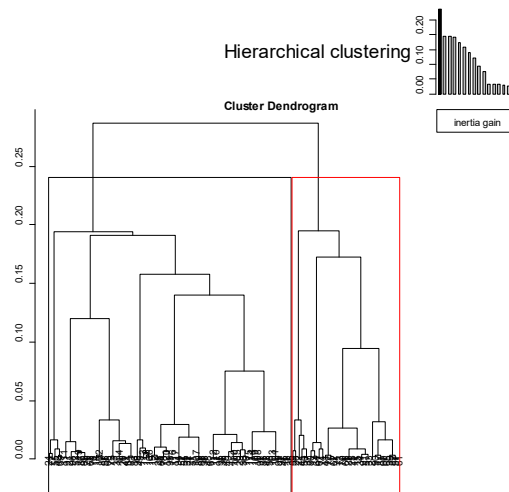
Figure C1



Appendix D

Cluster diagrams

The cluster analysis on 9 axes of MCA (the first principal components to account for about 82% of the variation) yielded the following tree for the Earth's shape, which led us to select two classes (clusters EC1 and EC2).



For the day-night cycle, we obtained similar results on 82.36% of the variance (7 axes of MCA):

