

AMBIGUOUS SYMMETRY: THE TYPICAL CASE OF HUMAN BEINGS

JEAN-YVES BEZIAU

Name: Jean-Yves Beziau (b. Orléans, 1965)

Profession: Professor, Researcher, Artist

Fields of interest: Logic, Philosophy, Mathematics, Arts, Cats

Affiliation: Federal University of Rio de Janeiro, Brazil

E-mail: jyb@ufirj.br

Homepage: www.jyb-logic.org

Major publications and/or exhibitions:

Beziau, J.-Y., *The Power of the Hexagon*, Logica Universalis, vol.6 (2012), pp.1-43.

Beziau, J.-Y., *A Chromatic Hexagon of Psychic Dispositions*, in M.Silva (ed), *How Colours Matter to Philosophy*, Springer International Publishing, Cham, 2017, pp.273-388.

Beziau, J.-Y., *The Pyramid of Meaning*, in J.Ceuppens, H.Smessaert, J. van Craenenbroeck and G.Vanden Wyngaerd (eds), *A Coat of Many Colours - D60*, Brussels, 2018.

Beziau, J.-Y., *An Analogical Hexagon*, International Journal of Approximate Reasoning, 94 (2018), pp.1-17.

Beziau, J.-Y., *Imaging Philosophical Discourse*, Polish Journal of Aesthetics, vol. 62, number 3 (2021).

Beziau, J.-Y., and Schulthess, D., *L'imagination*. College Publications. London. 2021.

C.Chantilly and J.-Y.Beziau, *The Hexagon of Paintings*, South American Journal of Logic, Volume 3, Issue 2 (2017), pp.369-388.

Abstract: *This paper presents, analyses and discusses the notion of ambiguous symmetry through the typical case of human beings, both from the physical and spiritual point of view. We first present a symmetry hexagon of opposition characterizing what symmetry is by relating it with opposed notions in particular antisymmetry and asymmetry. We then describe and comment the ambiguous symmetry of human beings. We emphasize that there is a contrast between an outside symmetry and an inside asymmetry, for example in the case of the torso. In the case of the hands, the left and right hands look symmetric but the way they work is not. This is related with the left and right parts of the brain which can be seen as a complementary symmetry, similar to the positive and negative integers. We also point out the vertical and horizontal asymmetries of human body and the asymmetry between male and female bodies. Male and female can however be seen as complementary symmetric from the point of view of the yin-yang Tao theory. It is a metaphorical way to explain that it makes sense to argue that God is symmetric and that human being is an image of God.*

Keywords: ambiguous symmetry; human beings; complementarity; Tao; God

CHARACTERIZING AMBIGUOUS SYMMETRY THROUGH A TYPICAL CASE, USING THE HEXAGON OF OPPOSITION

Symmetry, as many notions, can be better understood by relating it to some connected notions, similar or opposed. The theory of opposition is a good tool to describe these relations. Figure 1 presents a hexagon of opposition about symmetry (Beziau 2019, p.68):

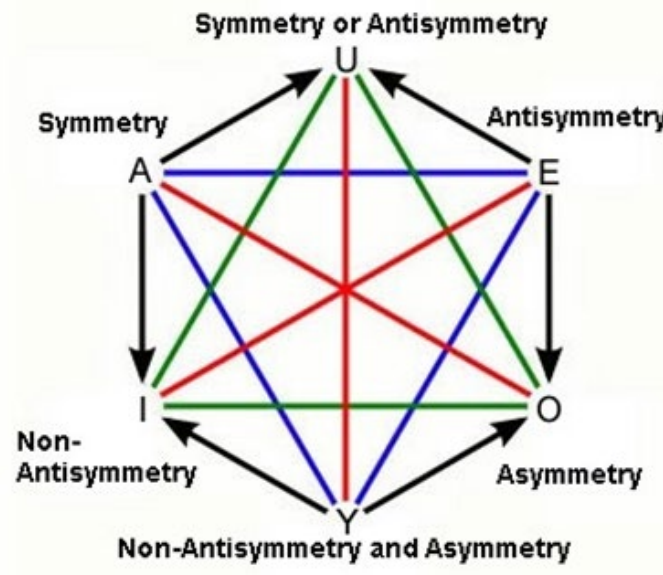


Figure 1 The Symmetry Hexagon

In this hexagon there are three notions of opposition:

- In red, two notions are *contradictory* iff (if and only if) they exclude each other, but together are exhaustive. In the present example, something which is asymmetric is not symmetric and something has to be either symmetric or asymmetric.
- In blue, two notions are *contrary* iff they exclude each other, but together are not exhaustive. In the present example, something cannot be at the same time symmetric and antisymmetric, but it can be neither symmetric, nor antisymmetric, this is the Y-corner of the blue triangle.
- In green, two notions are *subcontrary* iff they don't exclude each other, but together are exhaustive. In the present example, something can be at the same time non-antisymmetric and asymmetric, but it has to be non-antisymmetric or asymmetric. Something which is symmetric or (in an exclusive sense of "or", like in "cheese or desert") antisymmetric, lying in the top U-corner, is not both symmetric or antisymmetric, but is nevertheless either non-antisymmetric or (inclusive) asymmetric.

Subalternation in black is an implication, showing for example on the right side that antisymmetry is a particular case of asymmetry, or that the bottom Y corner represents things which are either non-antisymmetric or asymmetric.

This hexagon of opposition is an improvement of the square of opposition originally based on some ideas of Aristotle and later on explicitly designed by Apuleius and Boethius (Beziau and Vandoulakis 2021). The hexagon of opposition was mainly promoted in the 2nd half of the 20th century by Robert Blanché (1966). The hexagon is a very useful tool applying to many different notions, concepts, aspects of reality: music, paintings, semiotics, etc. allowing to characterize notions of many particular things, relating them together in a structure of opposition which defines 6 variations by relating them through concepts clearly defined (the 3 oppositions and subalternation). It is funny to use the hexagon to study symmetry because it is a perfectly symmetric figure (which is not the case of the square of opposition), that permits to characterize what is symmetric and what is not symmetric; “not”, not only in the sense of classical dichotomic negation but according to the variety of negations of the theory of opposition.

The important quality of the hexagon is that it gives a precise and visual understanding of many notions by relating them with other notions, without using mathematical formulas. The problem of using mathematical formulas is that there is not only one way to describe or define things, for example symmetry. One has to choose a rather specific context, for example a binary relation in first-order logic, and this is too specific to talk about the symmetry or asymmetry of human beings.

In this paper, we will study a case of what we call “ambiguous symmetry” and see how this hexagon can help us to characterize it. We are applying a methodology that can be named “typicity methodology”, which consists in analysing a notion through a typical case, instead of a general approach based on many different cases.

It is interesting to focus on human being,¹ considering that human beings are fundamental beings on earth. And also considering the religious view according to which human being was created as an “Image of God”. If God were perfectly symmetric, we could imagine that human being would also be, and vice-versa.

Few academic studies exist on the topic and they generally restrict to the body (see e.g. Hargittai 2009) and consider human beings as animals like other animals, for example other vertebrates (Ludwig 1932 , Weyl 1952, López-García Ros 2007). Moreover, these works do not discuss the asymmetry/symmetry between male and female, neither at the physical level, nor at the psychological or spiritual level.

TWO ASPECTS OF AMBIGUOUS SYMMETRY OF HUMAN BEINGS

INSIDE / OUTSIDE – TORSO AND HEAD – HANDS

Symmetry is an important feature of human body. In particular the symmetry of the face is considered as a feature of beauty.

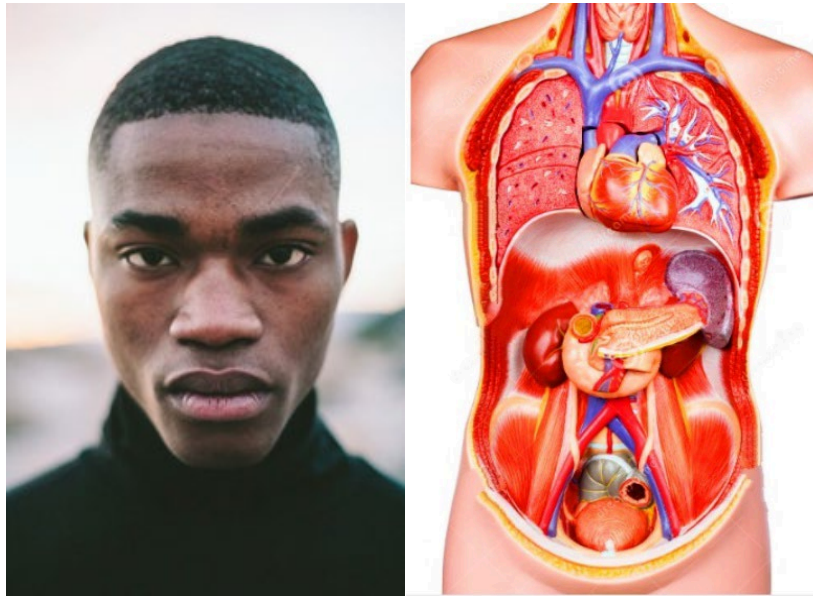


Figure 2 Outside Symmetry vs. Inside Asymmetry

There is also symmetry of the arms, legs, feet. But this external symmetry does not match the interior of the body (Figure 2). For example, the inside of the torso of the body inside is not symmetric by contrast to its external symmetric appearance. It is not completely antisymmetric, for example if we consider the lungs, but antisymmetry predominates.

Artificial objects can have this duality, external symmetry / internal antisymmetry, like a Formula 1 car which from outside is quite symmetric (from a width viewpoint), but the inside of the motor engine is not symmetric.

If we look at the inside of the head, it is also not completely antisymmetric, symmetry rather predominates, but there is the very important exception of the brain. There is the famous duality left and right sides of the brain promoted since the sixties, showing that each side of the brain has different qualities and functions. But the relation between the left brain and right brain can be seen as a complementary duality, where each part is an opposite complement to the other.

We can make an analogy with positive and negative numbers. This is indeed a symmetric situation, in which negative numbers and positive numbers can be seen as complementary dual as described by Figure 3.

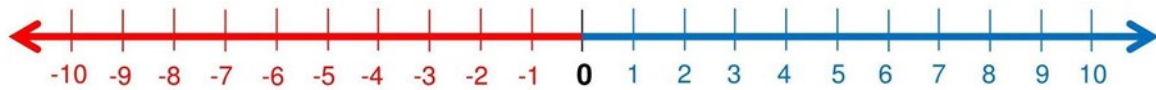


Figure 3 Symmetric Number Line of Positive and Negative Numbers

Related to the brain, there is also the strange case of the hands: the two hands are perfectly symmetric from outside, but the asymmetry of the way they operate is famous (about this, see Chapter 9 of Gardner 1990).

VERTICALLY/HORIZONTALLY, FRONT/BACK, MALE/FEMALE

From an external and internal point of view, vertically the human body is completely antisymmetric. It seems that nobody sees that as a problem ...

Horizontally, from the outside, the body is fairly symmetrical, both the front and the back. But front and back are not symmetric between each other, they are indeed completely antisymmetric, by contrast to the male-male, female-female creatures of the myth presented by Aristophanes in Plato's *Symposium*.

The two symmetric creatures of the myth are used to justify male and female homosexuality. In the myth there is also a third kind of creature, the androgyne, which is not front-back symmetric, being a male body and female body back-to-back.

From the body perspective, female and male are not symmetric, and reproduction of human beings, like of other mammals, results from the interaction between male and female bodies leading to either male and female bodies.

Now if we consider male and female not only from the point of view of the body, but from an emotional, psychological or spiritual point of view they also are not symmetric.

However, the yin-yang theory is abstractly represented by a Tao symbol which is symmetric. And male and female are considered as a typical example of the yin-yang theory, Yin being the female, Yang the male.



Figure 4 The Abstract and Spiritual Symmetry of the Tao

This can be justified by the fact that other instantiations of yin-yang, like day and night, which reflects the bicolor white and black symbolization of the Tao symbol, are symmetric from the point of view of light and timing (Figure 4).

One can argue that some psychological characters of male and female are *symmetrically opposed* in the sense that the union of the two leads to harmony.

If we consider the idea that human being has been created as an image of God, there is a serious ambiguity, because God is generally presented as only one being. But one may solve this ambiguity by saying that the union of male and female together is the image God, in this sense God will be a symmetric being, according to the perspective of *complementary symmetry*.

We use here the word “complementary” in particular by analogy with Bohr’s theory of complementarity (see Favrholt 1999). As we have previously pointed out (Beziau 20212), complementarity can be clarified by the notion of subcontrariety of the theory of opposition. Niels Bohr (1885-1962) designed his own coat of arms (Bala 2020) using the Tao symbol and the motto *Contraria sunt complementa* (see Figure 5).



Figure 5 Niels Bohr's coat of arms

CONCLUSION

As a whole, the ambiguous symmetry of human beings is a mix of asymmetry and non-antisymmetry, corresponding therefore to the bottom corner Y of the hexagon presented at the beginning of this paper.

However, symmetrical features of the human body, be it male or female, are important and also psychologically male and female may have some significant complementary symmetric features.

On the one hand, human beings are obviously not fully symmetric from the point of view both of a male body or a female body, but there are important local aspects of symmetry, in particular the face. On the other hand, the relation between the male and female bodies is not symmetric, but, at the spiritual level, symmetry may show up considering a complementary duality, analogue to the one between the left and right parts of the brain, in the spirit of the Tao theory.

ACKNOWLEDGMENTS

Thanks to two anonymous referees, Oksana Cherkashina, Denes Nagy, and Caroline Pires Ting for their useful comments.

REFERENCES

- Bala, Arun (2020). *Chinese organic materialism and modern science studies: Rethinking Joseph Needham's legacy*, Cultures of Science, Volume 3, Issue 1, pp.62-74.
- Beziau, Jean-Yves (2012). *The power of the hexagon*, Logica Universalis, vol.6 (2012), pp.1-43.
- Beziau, Jean-Yves (2019). *Symmetry of opposition*, in Symmetry: Art and Science 2019 / 1-4, Special Issue – 11th Congress and Exhibition of SIS. Special Theme: Tradition and Innovation in Symmetry – Katachi 形 Kanazawa, Japan, November 25-30, pp.66-69.
- Beziau, Jean-Yves and Vandoulakis, Ioannis (2021). *The square of opposition: past, present, future*, in J.-Y. Beziau and I. Vandoulakis (eds), *The Exoteric Square of Opposition*, Birkhäuser, Basel.
- Blanché, Robert (1966). *Structures intellectuelles. Essai sur l'organisation systématique des concepts*, Vrin, Paris.
- Favrholdt, David (ed) (1999). *Complementarity beyond physics. Niels Bohr Collected Works Volume 10*. Elsevier, Amsterdam 1999.
- Gardner, Martin (1990). *The New Ambidextrous Universe: Symmetry and Asymmetry from Mirror Reflections to Superstrings*. W.H. Freeman and Company, New York, 3rd edition.
- Hargittai, Magdolna and Hargittai, Istvan (2009). *Visual Symmetry*, World Scientific, Singapore.
- López-Gracia, Maria. L and Ros Marian A. (2007). *Left-Right Asymmetry in Vertebrate Development*, Springer, Heidelberg.
- Ludwig, Wilhelm (1932). *Das Rechts-Links-Problem im Tierreich und beim Menschen*. Springer, Heidelberg.
- Weyl, Hermann (1952). *Symmetry*, Princeton University Press, Princeton.

FIGURES

- Figure 2. On the left photo by Nico Marks on Unsplash <<https://unsplash.com/s/photos/niko-marks>>, on the right image by Ben Schonewille on Dreamstime <<https://www.dreamstime.com/stock-photo-artificial-human-torso-model-organs-isolated-white-background-image59560378>>.
- Figure 4. On the left picture by Svetap on Dreamstime <<https://www.dreamstime.com/svetap-latest-illustrations-vectors-clipart>>, on the right picture by Lisa Shrader on Awakening Shakti <<https://www.awakeningshakti.com/>>.
- Figure 5. Picture by Creative Commons / Graphic Lab <https://commons.wikimedia.org/wiki/File:Coat_of_Arms_of_Niels_Bohr.svg>.

¹ Depending on the circumstances, we will use the expression “human being” or the expression “human beings”, the distinction between singular and plural being important for our discussion.