

A NEW EXPERIMENTAL APPROACH TO THE STUDY OF BEAUTY

**A. Félix VICO-PRIETO; Juan M. ROSAS; José E. CALLEJAS-AGUILERA;
Angel CAGIGAS**

Universidad de Jaén, España
acagigas@ujaen.es

UN NUEVO ENFOQUE EXPERIMENTAL PARA EL ESTUDIO DE LA BELLEZA

Resumen: Las teorías de la percepción de la belleza pendlan entre la importancia de la proporción aurea y la importancia de los factores culturales y de aprendizaje sobre la percepción de la belleza. La contradicción entre estos enfoques puede resolverse tomando en cuenta la proporción real des aurea en lugar de la proporción ideal. Se propone un nuevo marco para llevar a cabo nuevos y más amplios enfoques experimentales para el estudio de la belleza.

Abstract: Theories of beauty perception have tilting between the importance of the golden section, and the importance of cultural and learning factors on perception of beauty. The contradiction between those approaches may be solved by taking in account the real golden proportion rather than the ideal golden proportion. A new framework to conduct new and more comprehensive experimental approaches to the study of beauty is proposed.

Palabras clave: Psicología Del Arte, Antropología, Belleza, Preferencia Estética, Proporción Aurea
Psychology Of Art, Anthropology, Beauty, Aesthetic Preference, Golden Section

The golden section is defined as a harmonic division of a line in extreme and mean ratio (Figure 1). In other words, the total length of a segment ($a+b$) is to the greater section (a) as the greater section (a) is to the smaller one (b). The value of the relationship between the greatest and the smallest section is approximately 1.6180 (Figure 1). This number has been named as the golden number, and it is symbolized with letter ϕ (*Phi*). The issues related with the golden section have been continuously debated since the ancient Greek philosophers, whom brought a theory of beauty based on the number and the proportion.



Figure 1. A segment division keeping the golden ratio.

However, the first empirical study about the relevance of golden section on aesthetic perceptions was conducted by Fechner (1876/1997). He presented a set of ten white rectangles on a black table, ranging in proportion from 1:1 to 2.5:1, to participants lacking aesthetic education. They were requested to select the one they liked the most. Fechner confirmed the hypothesis of the preference for golden ratio given that the golden rectangle was the most preferred.

Later, Pierce (1894) conducted a study in which he used three parallel vertical lines. Participants could move the third one, placing it between the other two. Six participants were asked to choose the “most agreeable” position for the middle line. Pierce reported that everyone chose a position for the middle line roughly close to the golden ratio.

There are also some studies in the literature do not find such a clear role for golden ratio in aesthetic preference. For instance, Angier (1903) suspected that golden ratio preference was actually a byproduct from the procedure of averaging across subjects’ scores. He asked his nine subjects to divide a horizontal line “at the most pleasing place” 72 times each. Although theme and proportion was near the golden section when looking at the mean (0.600), only two of the nine subjects chose the golden section with regularity. Angier argued that this performance confirmed his belief that the golden section is a mathematical abstraction rather than a universal aesthetic ideal (Green, 1995).

Konecni (2001, 2003) conducted different studies in which the role of golden proportion with artistic stimuli was explored. He analyzed the axis in paintings of the 20th Century, and the work of a group of professional painters that were requested to paint different images. These studies show results in agreement with the idea of the aesthetic value of golden ratio when artistic stimuli are used. However, the use of artistic stimuli in his studies involved the presence of unwanted variables such as complexity, color, etc., involved in real artistic works and that may be affecting aesthetic preferences beyond the golden ratio itself.

In summary, many experimental results seem to uncover the existence of a universal criterion of beauty based on the golden ratio; some of them suggest that this preference is innate while others reduce it to educational and cultural factors. However, there are enough experimental results denying the relevance of golden ratio in perception of beauty as to casting doubts on its relevance. What might it be the origin of these differences?

We suggest that these differences have their origin on the difference between real and ideal golden ratios. Real golden ratio is found in nature, while the ideal concept appears as a mathematical abstraction. Understanding this difference opens a way to analyze the dualism between beauty in nature and beauty in art, leading to retrieving a key concept on the history of art, *eurythmy*. The rupture with the *Great theory of beauty* may have its origin on

a strict interpretation of the “harmony and proportion” rules. Analyzing the golden section as a growth pattern in nature, we will realize that measurements of the growth patterns of plants and many animals, including humans, are close approximations, but not the golden ratio itself (Doczy, 2004). In fact, classical artists initially sought in nature to find the source of beauty. They transferred the proportions of nature to their concept of art (including the golden section). Artists did this process by an intuition that was empirically acquired, rather than basing it on *a priori* scientific premises. It was only later when artists sought for a theory of beauty (Tatarkiewicz, 1987).

If perfection is in mathematics, why is it needed to adapt things to the human eye so that beauty is brought up? Mathematics gives an excellent approach, but it is not the key to beauty perception. This approach would give a solid support to classical *eurhythmy*. There may be a universal aesthetic preference for the golden section that is not based in mathematical reasons, but in the presence of little imperfections (Langlois, Ritter, Casey, & Sawin, 1995). This assumption opens the research to the exploration of tiny deviations from the canon of golden section in the artwork, comparing, for example, aesthetic preferences in well-known artists, like Mondrian, who follow the golden ratio with slight variations (organic model), with the same works strictly modified to fit golden ratio (mathematical model) (Figure 2a). Or comparing faces with axes near the golden section (organic model) with the same faces modified towards an exact golden ratio (mathematical model) (Figure 2b). Our hypothesis is that aesthetic preference will develop for the *organic* golden sections, so that small imperfections on the mathematical model increase perception of beauty. This is something that still should be empirically tested.

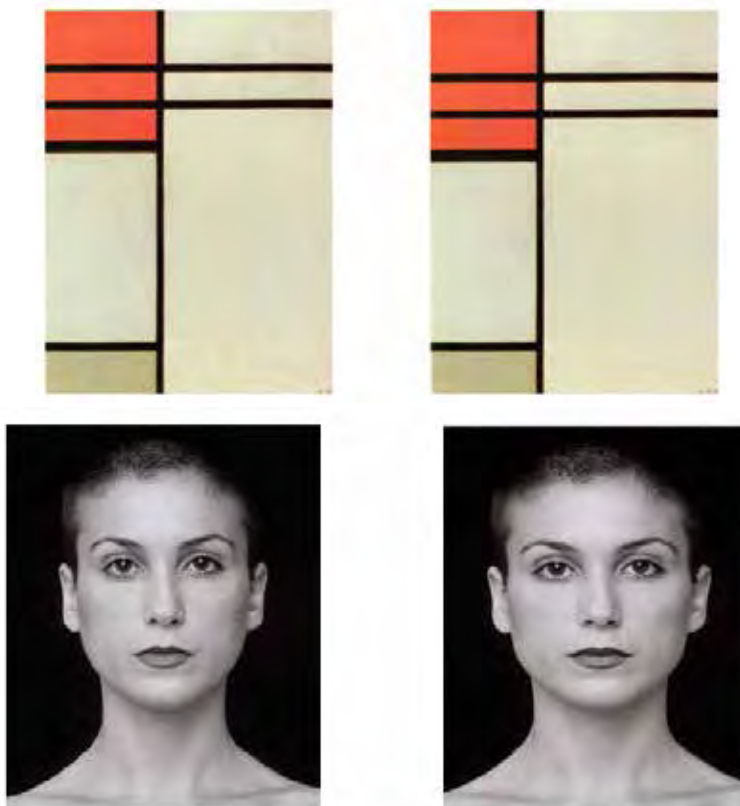


Figure 2. (a) A Mondrian’s adapted painting. “Organic” and “mathematical” variation. (b) Golden ratio face. “Organic” ratio and a “theoretical” golden section model.

References

- Angier, R. P. (1903). The aesthetics of unequal division. *Psychological Review: Monograph Supplement*, 4, 541- 561.
- Doczy, G. (2004). *El poder de los límites; proporciones armónicas en la naturaleza, el arte y la arquitectura*. Buenos Aires: Troquel.
- Fechner, T. (1876/1997). *Vorschule der Ästhetik*. Leipzig: Breitkopf und Härtel.
- Green, C. D. (1995). All that glitters: a review of psychological research on the aesthetics of the golden section. *Perception*, 24, 937-968.
- Konecni, V. J. (2001). The golden section in the structure of 20th-century paintings. *Psicología del arte*, 22, 27-42.
- Konecni, V. J. (2003). On the golden section: elusive, but detectable. *Creativity Research Journal*, 15, 267-276.
- Langlois, J. H., Ritter, J. M., Casey R. J., & Sawin D. B. (1995). Infant attractiveness predicts maternal behaviors and attitudes. *Developmental Psychology*, 31, 464-472.
- Pierce. E. (1894). Aesthetics of simple forms. *Psychological Review*, 1, 483- 495.

