Clarification and measure of vivid illusions favoured by Canova’s sculptures

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Abstract

Three relevant sculptures by Antonio Canova, housed in the Hermitage Museum of Saint Petersburg, were studied during their temporary exhibition, in different years from 1991 to 2008, in three Italian cities: Rome, Venice and Forlì. The Canova art works taken into consideration were: “The Graces” (1813), “The Hebe” (1795), and “Love Awaking Psyche with a Kiss” (1787-1798). We performed systematic observations by individually interviewing “in the field” many visitors viewing the three aforesaid works, in order to highlight and measure some vivid visual illusions. These are: visual shape sub-constancy and rigidity loss when “The Graces” are observed slantwise; visual position sub-constancy, and rigidity loss, when “The Hebe” is observed in different orientations with respect to the beholder position; and apparent movement, with rigidity loss, of the spread wings of “Love” during the rotation on its own axis of the “Love and Psyche” marble group. In this respect, we can also show a short video illustrating the illusory phenomenon.

Specific psychological measures were proposed and performed for these illusions, that reveal the action and development of processes important for experimental phenomenology as well as for aesthetics and for art history.

Keywords: Aesthetics, apparent movement, complexity, sculpture, underconstancy, visual illusions

1. Introduction and purposes of the studies

Contact of the artist and of the beholders with artistic sculptures comes about through visual perception, and thus the identification, description and measurement of visual phenomena, intuitively preordained by the artist, are of great importance for psychologists, critics and historians in order to understand his work. Three important art works by the Italian sculptor Antonio Canova, belonging to the Hermitage Museum of Saint Petersburg, were studied during their temporary exhibitions, from 1991 to 2008, in different Italian cities: Rome, Venice and Forlì. The Canova sculptures systematically studied were: “The Graces” (1813), “The Hebe” (1795), and “Love Awaking Psyche with a Kiss” (1787-1798). We performed systematic observations by individually interviewing “in the field” many visitors viewing the three aforesaid works, in order to highlight and measure some vivid visual illusions. These are: visual shape sub-constancy and rigidity loss when “The Graces” are observed slantwise; visual position sub-constancy, and rigidity loss, when “The Hebe” is observed in different orientations with respect to the beholder position; and apparent movement, with rigidity loss, of the spread wings of “Love” during the rotation on its own axis of the “Love and Psyche” marble group. In this respect we also show a short video illustrating the illusory phenomenon.
2. Visual shape sub-constancy, and rigidity loss, of “The Graces” observed slantwise

Visual shape constancy means that, whatever the observer’s viewpoint, the apparent shape of the observed object remains the same. In cases where shape instead appears to shrink the more it is observed slantwise, then we talk of sub-constancy. We noted that the apparent width of “The Graces” decreases as the beholder moves sideways towards the right or left of the work: that is, there is a loss of visual shape constancy, as happens with several wide configurations observed slantwise [2].

To check this eventuality, it is worth making an assessment of apparent shape by viewing the object from several angles. This requires the use of comparison scales, each presenting a series of elements that gradually shrink or become wider than the real-life object (method of limits; Fig. 1). For measuring shape, it is also worth using the verticality index already adopted by Musatti [9] in similar contexts in the past. It is given by the ratio between height and breadth of the element undergoing comparison. For the marble group of “The Graces”, this index is objectively 1.75 (Fig. 2).

![Fig. 1. Comparison scale for measuring the apparent shape of the marble group of “The Graces”.

In our experiment, sixteen visitors individually used appropriate comparison scales with seven elements each, always keeping the overall apparent shape of the sculpture within the visual field. The Point of Objective Equality (POE) corresponds to the central element (D), whose outline perfectly circumscribes the marble group overall shape (Fig. 3).

![Fig. 2. Front-parallel representation of “The Graces”.

Fig. 3. The central element (D) of the comparison scale perfectly circumscribes “The Graces” (POE).

The sculpture was seen from seven different angulations: frontwise and with a sideways shift of 30, 60, 90 degrees (both sides) with respect to the perpendicular direction of gaze.
Results show the progressive shrinkage, statistically significant: toward the right, $F_{3, 42} = 7.33; p < 0.001$, and toward the left, $F_{3, 42} = 25.51; p < 0.0001$ (overall analysis: $F_{6, 84} = 7.95; p < 0.0001$). Although asymmetrical, the marble group of “The Graces” must be well-balanced and harmonious if it can generate scores that are practically identical when the observer moves towards the right or left from the front-parallel view. One should also note that, in the front-parallel view, the evaluations of the overall shape given by the observers yielded a mean verticality index score of 1.55: corresponding to the element C (“Point of Subjective Equality”, PSE). This indicates an overestimation of the marble group width. This result may be attributed to the contrasting effects between the shrinkage phenomenon seen slantwise and the width evaluated when the direction of gaze is perpendicular.

3. **Visual position sub-constancy, and rigidity loss, of “The Hebe” with observer’s movements**

“The Hebe” is a standing but slightly leaning human figure, tilted 9 degrees with respect to the vertical: a position contrasting with the mental schema of a normally standing person (Fig. 4). In this case, we applied our previous studies on leaning building perception (Fig. 5) [5, 3]. Their inclination is generally underestimated when observed in ambiguous perceptual conditions, i.e. leaning forward or backward, because an assimilation process takes place of the visual image with respect to the mental schema of building, which is normally vertical and very regular. The inclination is emphasized when the same objects are shown in unambiguous perceptual conditions, i.e. leaning to the right or to the left; because a contrast process occurs, resulting in the anomaly overestimation. Forty visitors individually observed the statue of “The Hebe” from eight different orientations, again with appropriate comparison scales. The average inclination was underestimated in the four ambiguous orientations, was overestimated in the four unambiguous conditions, and was realistically evaluated in the four intermediate orientations ($F_{7, 266} = 20.63; p < 0.0001$).

![Fig. 4. “The Hebe”: A human figure tilted 9 degrees with respect to the vertical.](image1)

![Fig. 5. Experimental Building Model leaning 7 degrees with respect to the vertical [3].](image2)
4. **Apparent movement, and rigidity loss, of the spread wings of “Love” during the rotation of the “Love and Psyche” marble group**

The marble group of “Love and Psyche” exhibits spread wings in a V-shape (Fig. 6). In the version we examined, it rests with wheels on a round metal rail, also having bronze handles. These peculiarities can be explained only by supposing the intention of rotating the artwork itself, thus obtaining the illusory opening and closing of the large V-shaped wings. This phenomenon resembles our laboratory observations on a stylised cut-out of a bird with V-shaped wings (so-called “Rotating Bird” phenomenon; Fig. 7), or even on other angled structures (Fig. 8) [4, 2]. These structures included recently a scaled down model of Canova’s marble group (Fig. 9), slowly rotating around vertically arranged bisections: with the resulting impression of marked periodical opening and closing movements. In fact, the angled structures (measuring 90 degrees) appear more open when they are frontal-parallel and gradually become narrower as they are seen slantwise [2]. We present here a short video on the computer very clearly showing this phenomenon. Note that in the past, critics and art historians did not study this visual effect and its conditions, which must be known and evaluated in order to fully comprehend the artist’s intentions and the beholder’s experiences.

![Fig. 6. The spread wings of “Love”](image1)

![Fig. 7. The spread wings of the “Rotating Bird”](image2)

![Fig. 8. Rotating angled structure](image3)

![Fig. 9. Rotating model of Canova’s marble group](image4)
5. Conclusion

The structural quality of the complexity, combined with that of the order, has been authoritatively considered as a condition favouring aesthetic experience [6, 7, 1, 8]. The singular variations of phenomenal shape and position, and the illusory movements, are a specific condition of complexity, at the phenomenal level. To obtain a measure of the corresponding visual effects and conditions, phenomenological analysis and appropriate evaluation scales were necessary. We stress the opportunity of centring this reality level alongside the attention to mere physical measures. This methodological approach, consonant with the humanities, is very close to the intentions of the artist involved in his work and to the beholders’ genuine experiences. In the case of Antonio Canova’s interesting and elegant sculptures, mostly housed in the Hermitage Museum of Saint Petersburg, the analysis of the phenomenological variables, the comparison with data from other relevant experimental situations, and the measures of visual illusions, assured the identification, proper description and evaluation of the object under study.

References