

Visual illusion in *ARTPOP* and pop art

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Lady Gaga's fourth CD album *ARTPOP*, designed by American pop artist Jeff Koons, adopted one of my illusion works, namely, *Hatpin urchin*, as the main inside design. This occurrence was significant for the study of visual illusion in the following three senses: first, it drew people's attention to visual illusion; second, the chosen illusion was novel; and third, for the first time in its history, visual illusion was recognized as ubiquitous.

Key words: visual illusion, motion, pop art, Ōuchi–Spillmann illusion

Lady Gaga's fourth CD album *ARTPOP* included artworks of visual illusion

American pop artist Jeff Koons designed the cover and inside of Lady Gaga's fourth CD album *ARTPOP*, which was released on November 6, 2013. He adopted a novel type of visual illusion that features a moving, shaking, or jerking optical effect, as well as chose one of my illusion works, *Hatpin urchin* (Figures 1 and 2). This occurrence was significant for the study of visual illusion for reasons other than the expected interest to visual illusion from people influenced by Lady Gaga's superstar status worldwide. In this paper, I will try to cast light on unnoticed but significant influences.

The chosen illusion is novel in the study of visual illusion

Hatpin urchin is an artwork of a novel type of motion illusion, which I tentatively call "moving stripes illusion." The basic images are given a drifting expression (Figures 3a and 3b), a rotating demonstration (Figure 3c), and a radially moving expression (Figure 3d). The illusion of motion is achieved by meeting the "necessary condition" of arranging stripes of black (dark) and white (light) elements placed in front of a gray background (intermediate luminance) (Kitaoka, 2012). Stripes of black and white squares are sufficient for rendering the illusion (Figure 3b), whereas adding oblique components to the stripes enhances the effect (Figures 3a, 3c, and 3d). No models have been proposed to explain these characteristics.

As far as I know, the first demonstration of this illusion is

attributed to American mathematical artist Jeff Berkeley in his artworks of fractals *Fractal Illusion* (Figure 4a) and *Fractal Zap* (Figure 4b) created in 1993 and 1994, respectively. Koons did not choose these images for the CD design. Instead, he included Tautvydas Davainis's illusion artwork *5 minutes after the Philadelphia Experiment* produced in 2010, which appears to be a derivative of Berkeley's artworks. In my case, I encountered Berkeley's artworks before 2008, extracted the "moving stripes" illusion from them, and then created *Hatpin urchin* in 2008.

The Ōuchi–Spillmann illusion was also included

An image of the Ōuchi–Spillmann illusion was adopted for the back cover of the CD (Figure 5). This image was also produced and provided by me. Koons's agent consulted with me regarding this illusion, and I informed her of the study of this illusion. This illusion had been called "Ōuchi illusion" but I asked the agent to label it "Ōuchi–Spillmann illusion" to pay respect to the discoverer Lothar Spillmann, who had recently published a paper entitled "The Ōuchi–Spillmann illusion revisited" in *Perception* (Spillmann, 2013).

I was unaware of the intention of Koons for including the illusion. However, I imagine that he intuitively thought of the Ōuchi–Spillmann illusion as being closely related to the "moving stripes" illusion. This idea might be plausible because the latter is obtained by reducing the image of the former (Kitaoka, 2012), as shown in Figure 6.

Significance of visual illusion being chosen by the pop artist

Pop art is an art movement that emerged in the 1950s in Britain and the USA (Livingstone, 1990). Jasper Johns, Robert Rauschenberg, Andy Warhol, and Roy Lichtenstein gained

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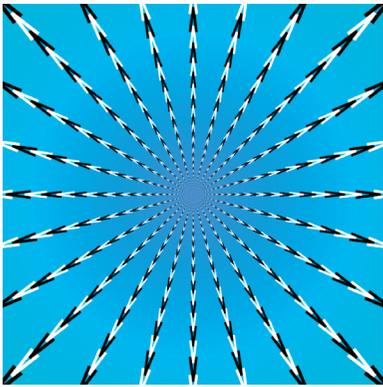


Figure 1. *Hatpin urchin* (2008, <http://www.psy.ritsumei.ac.jp/~akitaoka/opart5e.html>). The radial arms appear to expand or contract abruptly, triggered by the eye movement of observers. This work was adopted for the cover of “Special Issue: 169 Best Illusions” published by *Scientific American Mind* in 2010.



Figure 2. The inside of Lady Gaga’s fourth CD album *ARTPOP* designed by Jeff Koons. The background of the original work was changed from blue to pink (reproduced with permission from UNIVERSAL MUSIC LLC).

fame as pop artists in the 20th century. Pop art challenges traditions of fine art or high art, as well as includes imagery from popular culture or industrial mass products, such as advertising, news, designs, comic books, commodities, or mundane cultural objects. In other words, objects or motifs used in pop art are popular to the general public or regarded as ubiquitous.

Visual illusion had never met this criterion before the information and communications technology revolution because people experienced visual illusions or illusion works in psychology textbooks or in science museums. At present, people can see them on the Internet. This ubiquitous nature of visual illusion has been accomplished by the parallel development of telecommunications technology and infrastructure, PCs, cell phones, as well as a variety of communication networks. Furthermore, many contributors in the world continue to study visual illusion or create illusion works.

Jeff Koons, one of the most prominent contemporary pop artists, chose visual illusion for the CD design of the superstar Lady Gaga’s *ARTPOP*. The ubiquity of visual illusion was confirmed by this event, creating a historical mark in the study of visual illusion.

Some remarks

The design of the front cover of *ARTPOP* (Figure 7a) shows a nude sculpture of Lady Gaga with a blue glazing ball, both of

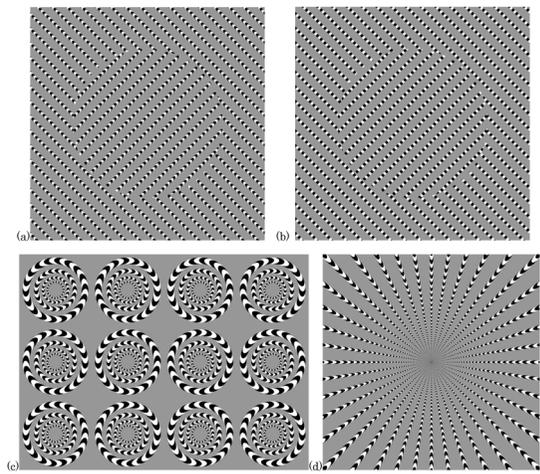


Figure 3. “Moving stripes” illusion. In (a) and (b), the inset appears to drift. (c) Each block of rings appears to rotate quickly. (d) Radial arms appear to expand or contract.



Figure 4. Jeff Berkeley’s artworks *Fractal Illusion* (1993) and *Fractal Zap* (1994) (reproduced with permission from Jeff Berkeley).

