

The Surreal Art of Rene Magritte and Visual Processing: Analysis of Two Iconic Paintings

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Abstract

René Magritte (1898-1967), the great Belgian surrealist, once said “...the function of art is to make poetry visible, to render thought visible”. The poetry emerged on his canvases by meticulous, aesthetically engaging depiction of objects and scenes replete with surprise and apparent perceptual self-contradiction. Visual neuroscience now recognizes that pictorial art can reveal some of the visual brain’s “neural rules” and processing hierarchies. This article examines two salient exemplars drawn from Magritte’s vast oeuvre. The first is his 1933 masterpiece, ‘La Condition Humaine’ (The Human Condition), one of his most philosophical works. We see a room with a painting on an easel that appears to paradoxically reveal exactly what it occludes: a pastoral scene outside the room. I examine in detail the visual cues that elicit an alternation between salient yet mutually exclusive percepts, transparency vs opacity, of the same object. The conflicting percepts are experienced as surreal, drawing us into the heart of the problem: the nature of representation (in art and in the brain), and a meditation on the localization of thought, even the nature of reality. A second masterpiece, ‘Le Blanc Seing’ (1965), is visually stunning, beautifully rendered and, at first glance, otherwise unremarkable. We see a tranquil scene with a woman on a horse passing through a stand of trees. However, Magritte has embedded several jarring effects that induce surreal competition between figure and background, challenging object integrity, including a shocking, apparent interruption of the horse’s torso replaced with distant, background foliage. In the course of my research on *Le Blanc-Seing*, I came upon a plausible pictorial inspiration for the painting in a brief scene from a 1924 German silent film which I illustrate here. This connection had been hinted at before (Whitfield, 1992), but had never been demonstrated pictorially until now. Both of these masterpieces illustrate what I call the power of subtle painterly gesture, i.e. when small details act as ‘perceptual amplifiers’, inducing a strong effect on both our perceptual and cognitive understanding of scene elements across a large region of visual space. In addition to their deep and complex aesthetic appeal, both works are also virtual courses in perception with many elements that direct our attention to the pictorial details that elicit perceptual figure-ground segregation, object identification, cues for depth perception, Gestalt Laws of occlusion-continuation and visual scene organization.

Keywords: René Magritte, *La Condition Humaine*, *Le Blanc-Seing*, surface perception, object segregation, figure-ground, scene representation, depth

perception, surrealism, neuroscience and art, surrealism, object segregation, figure-ground, image statistics, Gestalt principles.

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Introduction

In 1922, a young René Magritte was sitting in a Brussels café when the Belgian writer Marcel Lecomte placed in front of him an open issue of the magazine *Valori Plastici*. There in front of René was a reproduction of a 1914 painting by the Italian metaphysical painter, Giorgio de Chirico, *The Song of Love*. The painting depicted objects not normally seen together in life or in art: a white-gray sculpture of a Greek-Style head suspended on a wall next to an enormous surgical glove. In the background, behind some stylized architecture, was a black train with billowing white smoke emerging like a low cloud from the smoke-stack. The juxtaposition of these odd elements had an unexpected, enormous impact on young René. Despite only seeing a monochromatic reproduction of the painting, Magritte was overwhelmed – it literally brought him to tears. It was “...one of the most moving moments of my life: my eyes saw thought for the first time...” Magritte’s idea of art was forever changed. He realized at that moment the ascendancy of Poetry over Art: “...I decided that all my paintings would be visual poems”. And he articulated a philosophy: “The function of painting is to make poetry visible...to render thought visible” (Gablik, 1970).

Magritte’s journey to become one of the most important Surreal artists of the 20th century thus began with a glance and an epiphany. The massive oeuvre of works that followed, and Magritte’s mastery of infusing the ordinary with surreality, reach us on many levels — perceptual, cognitive, emotional, aesthetic and philosophical.

Representation of Representation: *La unCondition Humaine* (1933)

Magritte had a modern understanding of perception of the ‘world out there’, external reality, as the phenomenological experience of representation in the brain. Many of his works explicitly dealt with this theme, including his famous rendition of a pipe painted directly above the words “Ceci n’est pas une pipe” (This is not a pipe) (*La Trahison des Images*, *The Treachery of Images*, 1929), and a series seven works between 1931 and 1949 all titled *La Condition Humaine* including one of the more famous versions painted in 1933 (Fig. 1).



Figure 1. 'La Condition Humaine' (The Human Condition, 1933). Oil on canvas, 100x81 cm, National Gallery of Art accession-num 1987.55.1 (ISBN: 0810963590)

A Painting within a Painting that Reveals what it Conceals

We find ourselves inside a room, looking out of an arch-topped window onto a lush verdant field through which passes a small dirt path. A lone tree stands mid-field near a large tuft of shrubbery, with green hills softly illuminated in the background under a blue sky and cotton-puff clouds (a recurring theme in Magritte's work). To some viewers, it is not immediately obvious what a striking visual effect Magritte has created. A huge section of the scene outside seems to reside inside the room, as a detailed image of what eventually is understood to be a realistic painting sitting on an easel just inside the window. The painted image appears so perfectly matched to the scene outside that the painting in the room transiently (paradoxically) seems like a window or transparent glass, allowing us to see through it to the scene outside. The painting depicted in the room seems to reveal (if intermittently) exactly what it conceals. This device, recapitulated in many of Magritte's paintings, reflects a philosophical observation that Magritte articulated: "Visible things always hide other visible things" (Whitfield, 1992, cat. 62).

In *La Condition Humaine*, Magritte has set a perceptual 'trap' for us, masterfully guiding us to experience an alternation between two salient, but incompatible, perceptions: *transparency vs opacity*. Associated with each of these mutually exclusive perceptual states are fascinating perceptual and conceptual paradoxes.

Transparency

For many viewers, the initial perception is of transparency, as if the canvas were a pane of glass, in effect itself a window to the scene outside the room. Magritte enlists at least two devices that draw us to see the canvas area as if it provided a transparent view to the outside scene: (1) continuation of salient scene elements across the canvas border, (2) the strategic use of 'value', artists' word for brightness or lightness.

Perceptual impact of continuation features

Some viewers do not even see a canvas at first. The percept of transparency, when experienced, is induced by Magritte's meticulous enlistment of a 'Gestalt trick': i.e., the apparent continuation of key scene elements outside the frame of the canvas across the canvas borders ("Gestalt Law of Good Continuation"; Michotte and Burke, 1951; Michotte *et al.*, 1964).

The visual system's completion mechanisms permit Magritte to effectively seduce us to see the area of the canvas as transparent by continuation of five key scene elements outside the frame of the canvas across the canvas borders: (1) the distant trees in the background have two boundaries that cross the right edge of the canvas, one treeline-sky boundary and another where the distant trees form a boundary with the central bushes; (2) the upper and lower boundaries of the central bushes cross into the right edge of the

canvas; (3) the borders of three clouds with adjacent blue sky cross the canvas boundary in five locations; (4,5) the brown dirt path and its two borders with the grass cut diagonally across the scene and traverse the right edge of the canvas. The completion of contours based on their positions and orientations occurs due to perceptual mechanisms of contour interpolation (Kellman and Shipley, 1991) that are consistent with statistics about the continuity of contours across gaps in natural scenes (Geisler and Perry, 2009). In addition to completion based on contour relations, the surface qualities of the bushes and clouds are visually connected across gaps due to a surface spreading process that depends on similarity of surface color and texture (Yin *et al.*, 1997, 2000).

These five scene elements contribute nine object boundaries that cross from outside the canvas into the scene on the canvas at 11 locations. Collectively, these border crossings elicit a perceptual bias to amodally complete the objects along their entry trajectories across the canvas boundaries. The main, unambiguous amodal completions are the completions of the scene elements that traverse the right canvas edge (scene elements 1, 2, 4 and 5). However, two of the three clouds that enter the canvas area are subject to negligible occlusion since they traverse the scarcely noticeable upper edge of the canvas marked by a thin line, and so these features convey an implied amodal completion only when the canvas area is being perceived as opaque.

Note that the boundaries of the cloud on the lower right, though ‘fuzzy’, conform to the geometry of (‘fuzzy’) contour relatability and also engage surface interpolation processes (continuation of texture, shading, chromaticity; e.g. see Kellman and Fuchser, 2023; Kellman *et al.*, 2005a,b). Completion of the other scene elements traversing the right canvas edge also occurs due to contour interpolation, including the fuzzy contour geometries/trajectories that cross the right edge of the canvas (e.g., dirt path, grass, bushes, distant hazy hills and the rightmost cloud). They are also perceptually connected by surface interpolation utilizing, in part, compatible spatiochromatic properties and approximate luminance across the occluding boundaries (Kellman and Fuchser, 2023; Kellman and Shipley, 1991).

Cognitive Completion of Scene Elements

The acceptance of the scene elements that cross into the canvas area as replicas of (direct views of) those same elements in the distant scene outside the window establishes a generalized perceptual bias such that other scene elements, depicted far from the canvas edges, are also accepted as views of the same elements outside the room. Most conspicuously, this includes the tree standing in the midst of the grove of bushes. We can see it as either residing inside the room on an opaque canvas, or as a tree, far outside the room, in the field: we localize it in 3D space according to how the canvas area is perceived, opaque or transparent.

Magritte addressed these internal scene elements, in particular the central tree, using language that revealed a rather astute understanding of perception as representation in the brain: “I placed in front of a window, seen from inside a room, a painting representing exactly that part of the landscape that was hidden from view by the painting. Therefore, the tree represented in the painting hid from view the real tree situated behind it, outside the room. It existed for the spectator, as it were, simultaneously in his mind, as both inside the room in the painting, and outside in the real landscape. *Which is how we see the world: we see it as being as outside ourselves even though it is only a mental representation of it that we experience inside ourselves...*” (Magritte, 1938b; italics mine).

Magritte’s Use of ‘Value’ (Lightness) Biases Towards Perceived Transparency

David Sylvester, the famous British art critic who wrote extensively about Magritte, wrote regarding his experience viewing *La Condition Humaine*: “...the question is usually whether it [the canvas] is a picture or a pane of glass. There is always perfectly clear evidence that it is not a pane of glass. Nevertheless, every time I confront *La Condition Humaine*, I begin by seeing the canvas as a pane of glass: the luminosity does it” (Sylvester, 1969, p. 8, p. 71)

Sylvester’s reaction highlights another cue that Magritte enlisted to guide us into seeing the canvas area as a transparent glass ‘window’ to the outside scene. He was careful to equate the ‘value’ (artists’ word for brightness) of the canvas region to the overall value of the scene outside the canvas boundaries. This match tends to perceptually bind the scene elements depicted within the area of the canvas with the outside scene (Gestalt Law of Similarity; Wertheimer, 1922, 1923, 2012; also summarized in Wagemans *et al.*, 2012). The ‘value-match’ enhances the impression of the canvas area being transparent, thus biasing us to experience a surreal ‘resonance’, a perceptual competition, with perceived opacity. If the canvas area is manipulated to have a reduced brightness, the effect, even if transient or intermittent, is to bias our perception of the canvas area towards seeing it as an opaque object, attenuating the surreal ambiguity Magritte intended (as was done in Jakesch *et al.*, 2013). Fig. 2 shows a version of the painting with the canvas area brightness was reduced by approximately 8%.



Figure 2. The canvas area was reduced in brightness by 8%. Note that the tendency to see the canvas area as a transparent window-like view of the outside scene is reduced when the canvas brightness does not match the brightness of the outside scene. Alternatively, it could be seen as transparent ‘smokey glass’.

Opacity

Magritte ensures that our percept of transparency alternates/with, competes with perceived opacity by depicting seven cues that induce a percept of ‘opaque painted canvas’, highlighted by the numbers in Fig. 3: (1, 2) the invasion and apparent occlusion of the brown curtain edge by the two left canvas corners, (3) the thin shadow of the easel clamp onto the (implied) opaque paint on the canvas, (4, 5) the two thin lines marking the upper and lower edges of the canvas, (6) the white edge of the right side of the canvas. The seventh is an invisible cue, an *absence* of a feature, that serves as the most profound

and salient perceptual/conceptual proof of opacity: the disappearance of the easel behind the painting. Curiously, this cue is often not noticed by some viewers, even art-savvy viewers, until it is pointed out.

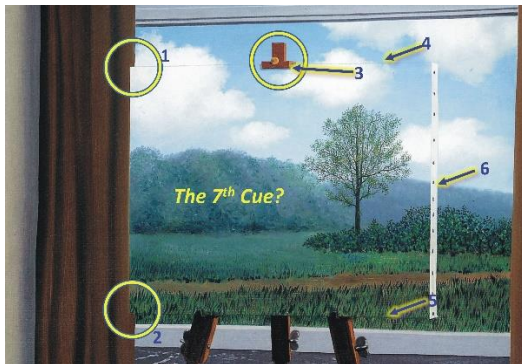


Figure 3. Seven cues, highlighted by numbers, draw us to perceive an opaque canvas. The 7th “cue”, unlike the other six is not a visible feature (hence the “?”), but the absence of one (see text). Though this feature sometimes goes unnoticed, even by expert viewers, it is the strongest “cue” to perception of opacity via its implied (cognitive) occlusion by the canvas, and cognitive completion behind it.

Eventually viewers understand that the easel legs, which at first glance seem to defy gravity, link up with the tiny clamp at the top of the canvas. And this perceptual/conceptual link occurs despite the large gap between the tops of the legs and the clamp which presents a challenge to perceptual contour reliability mechanisms (Kellman and Fuchser, 2023). Moreover, the completion occurs despite the fact that the specific structure of the hidden section of this particular easel is unknown and need not include a direct-line link between easel legs and clamp. In fact, in general, the height of easel clamps is often vertically adjustable to accommodate different canvas dimensions. However, Magritte seems to have intended for such a perceptual link

to occur since he ensured that the linear trajectory of the easel legs all pointed precisely towards the clamp.

Based on our priors about general easel structure, we know that the legs must be linked with the clamp. In addition, similarity along other dimensions (e.g., correspondence of wood color and texture) promotes the completion. Our interpretation of the legs as connected to the clamp is thus likely not specified by early perceptual processes, but involves ‘recognition from partial information’ (as discussed in Kellman, 2001; Kellman *et al.*, 2005b), knowledge about easel structure, as well as plausible physics (e.g., the improbability of free-floating clamps).

Other details

in the depiction of the canvas contribute to a perception of opacity. The canvas borders form 12 T-junctions in relation to the surrounding scene elements: four T-junctions at the canvas corners, two on each side of the easel clamp, and six T-junctions where the three easel legs meet the bottom of the canvas. These T-junctions also contribute to the perception of the canvas area as figure, as opposed to a direct view to the outside distant scene (Nakayama and Shimojo, 1992; Nakayama *et al.*, 1995, Rubin, 2001). In addition, *La Condition Humaine* also has several ‘fuzzy junctions’ that also contribute to the perception of the canvas area as occluding figure (e.g., clouds–canvas, grass–canvas, dirt path–canvas intersections).

‘Perceptual Amplifiers’: the Power of Subtle Painterly Gesture, when Small Details Have Profound Perceptual Impact

Shown below are two versions of the *La Condition Humaine*. The original version is shown on the right (Fig. 4B). In the version on the left (Fig. 4A), I have masked the left edge of the canvas by inserting a sliver of the curtain, and the right canvas edge has been removed.

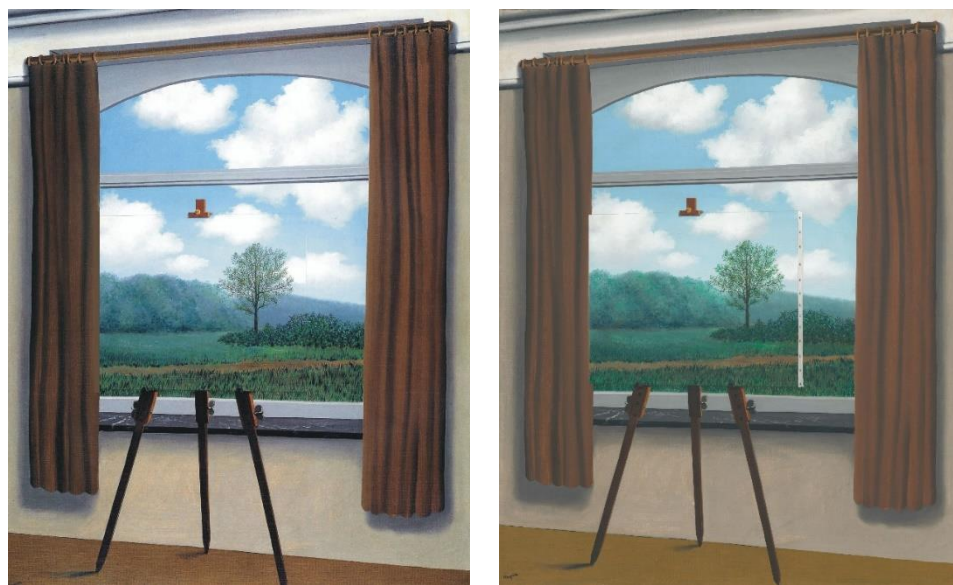


Figure 4. A (left). ‘La Condition Humaine’ with left canvas edge now masked by a strip of the brown curtain, and the right canvas edge replaced with the outdoor scene elements. **B (right).** The original painting as in Fig. 1 is reproduced here for ease of comparison with panel A. The two panels highlight the importance of the two incursions of the corners of the canvas into the left curtain at the top and bottom of the canvas. These small details act as “perceptual amplifiers”, establishing border-ownership by the canvas, and concomitantly imbuing the entire canvas with opacity, the same opacity seen in those corners.

If you compare the left edge of the canvas in the two panels in Fig. 4, you can see that, as discussed above, the small 90° cutout of the drapes at the top left of the canvas in Fig. 4B biases us to perceive an occlusion of the curtain by the top left corner of the canvas (cues 1 and 2, Fig. 3). The bottom left corner of the canvas also invades the curtain, but it is much lower in contrast and less salient. These two small details have amplified perceptual impact:

(1) They elicit perceptual understanding of the ‘border ownership’ of that contrast edge by an *opaque* canvas (Craft *et al.*, 2007; Koffka, 1935; Zhou *et al.*, 2000). The border ownership propagates down the entire contrast edge to the other corner. (2) A perceived depth order is established (canvas in front of curtain). (3) The depth order is associated with a perceived occlusion of the right edge of the curtain implying an opaque canvas. In effect, the perception of opacity at the thin strip of the left edge of the canvas imbues the entire canvas area with its properties akin to Kellman’s ‘surface interpolation’ (Kellman and Fuchser, 2023; cf. Rubin, 2001). This perceptual propagation highlights the visual system’s prioritization of extraction of surfaces from the lower-level input features in the process of object segregation and identification from memoric priors (Nakayama and Shimojo, 1992; Nakayama *et al.*, 1995; Rubin, 2001).

However, those small invading corners of the canvas contain elements from the outside scene: cloud is seen in the top left corner, and grass in the bottom left corner. These features belong to the distant background, and thus contradict our perception of an opaque canvas situated much closer to us. Yet, the perception of occlusion of the curtain draws us back to see opacity.

Because these small details (especially the more salient top left corner) tend to bias our perception to see an opaque canvas, they behave analogously to the accentuation principle delineated by Pinna *et al.* (2014). They showed how a small dot (or multiple small dots), strategically placed, can convert the perception of an entire extended pattern to be seen as either background or figure depending on the geometry of the pattern and the placement of the dot(s) within the pattern. However, the elements described here as ‘perceptual amplifiers’ (the canvas corners) serve double-duty because the background (e.g., cloud) is seen in the same locale as the feature that elicits perception of (foreground) figure. Its effect depends on the net global interpretation of the canvas area as either opaque canvas or a transparent view of the outside scene.

Perceptuo-Cognitive Paradoxes

In *La Condition Humaine* (1933), and in several other versions of this painting, and in similar works like the variants of *La Belle Captive* (the Fair Captive, 1931, 1947, 1948), Magritte explores his rule that “visible things always hide other visible things” (Whitfield, 1992, cat. 62), but, provocatively, mocks it by depicting objects that seem to either reveal what they conceal (e.g., the outdoor scene on the canvas), or conceal what ought to be visible. *La Condition Humaine* provokes a number of perceptuo-cognitive paradoxes that may not be immediately noticed. These are elaborated below.

Paradox 1: Transparent Canvas Occludes Opaque Objects, yet Imbues Them with Transparency

Once you realize the role that the top and bottom left corners play in establishing our perception of the canvas as opaque, you realize Magritte has pulled us into a ‘nested paradox’. Why did Magritte abandon his ‘reveal-what-is-concealed’ approach when painting the two small left canvas corners invading the curtain?

Even in the ‘invasion zone’, we seem to see right through the curtain to the scene outside the window, implying that not only is the canvas transparent in that region, but, paradoxically, the occluded curtain is itself transparent. If the outside scene is visible ‘through’ the rest of the canvas, the edge of the curtain ought to be similarly visible ‘through’ the canvas. The logic of the painting demands this. Yet these two small details (left canvas corners), which serve as strong cues for perceiving the whole canvas as opaque, also appear to be transparent corner ‘windows’ to the outside scene. The two most likely (but not the only possible) interpretations of this part of the painting are: (1) the curtain has been cut out exactly along the entire left edge of the canvas to match the geometry of the canvas, or (2) the (amodally completed) curtain is intact, and the invading canvas edge is occluding that portion of the curtain. In the first case, we would have to accept (perceptually speaking) an unlikely curtain configuration: unlikely based on priors as well as the structure of the matching right-hand curtain that Magritte presents to us. We would still be left with the two main competing percepts of the canvas — an opaque painted canvas that reveals what it conceals, but without the added paradoxical implication of a section of transparent curtain.

The second, more natural (and more likely) interpretation follows the implicit logic of the painting and adds the paradoxical implication that the occluded sliver of curtain is itself transparent, in violation of our priors about thick, light-blocking curtains.

These competing perceptual interpretations of the left canvas edge, and the implied propagation of the induced canvas properties, highlight the dynamic interplay between bottom-up sensory signals and top-down, even cognitive input to the ultimate percept.

Analogously, during those moments when we see the canvas as transparent, we do not see the huge section of easel in the center of the canvas. The only way we could see the complete, unobstructed outside scene would be if the easel too were transparent. However, the disappearance of the main section of the easel forces our perception back to seeing the canvas as opaque, occluding the easel. Yet, the apparent identity of the scene-on-canvas with the (presumed) scene outside continues to draw our perception back towards seeing the canvas as a transparent ‘window’, which logically (but impossibly) implies a transparent easel.

Paradox 2: when ‘Far’ Becomes ‘Near’: Collapse of Disparate Depth Planes

During the moments when we perceive the canvas as opaque, our visual system readily accepts elements from the scene outside the room ‘magically’ jumping space, across multiple depth planes, to appear on a flat canvas near us inside the room. The jump from a vividly perceived distant scene (outside the room) to near (canvas surface) is accepted despite Magritte’s meticulous depiction of cues that firmly establish relative depth of all the objects in a robust 3D scene in which objects at vastly different distances are depicted.

This ‘plane-jumping’, ambiguous localization, reflects, and is a consequence of, a conflict between lower-level visual mechanisms that analyze basic object features and strive for perceptual continuity, and higher processing mechanisms that segregate objects and organize them into cogent 3D perceptual space.

This conflict is one of several elements in this painting that contribute to the salience of ‘surreality’, the shock of self-contradiction. The top left corner of the canvas in Fig. 4B is a good

example: perceptually we can assign that feature to the white, distant cloud ‘seen’ through that corner, or to a painted depiction of a cloud localized on the (near) plane of the canvas surface. Notice also that the two alternative percepts of this detail are associated with implicitly distinct material properties – open space (or transparent glass, for example) vs paint-on-canvas (Ritchie and van Buren, 2020).

As noted in Ritchie and van Buren (2020), alternation between different depth planes is evident in some well-known images like Rubin’s (1921) face–vase illusion, as well as an intriguing variation in which the faces are filled in with a real-world outdoor scene that elicits perceived depth to the horizon, and the vase region is replaced with a dark, moonlit evening view of an outdoor scene. In this example, Ritchie and van Buren reproduce Pinna *et al.*’s (2018) demonstration that accentuating red dots added to the classic Rubin vase bias our percept to see the vase region containing the dots as figure. However, in the outdoor-scene variant, with red dots replaced by an image of a moon that reflects off some distant outdoor scene elements, the moon-dots draw us to see the vase shape as background, not figure.

Therefore, the small piece of cloud in the upper left corner of the canvas can function perceptually either like Pinna *et al.*’s dots (biasing towards figure, and hence towards opacity) or like Ritchie and van Buren’s outdoor-scene variation, biasing towards background (transparent canvas).

Why We Tend not to See a Logical Alternative Interpretation of the Scene

Magritte was a skilled enough artist to have guided us to perceive the entire outdoor scene as having been painted on the glass of the window. However, Magritte went out of his way to prevent us from seeing the painting that way. He certainly had thought of this approach as evidenced by several variants of *La Condition Humaine*, such as *La Clef des Champs* (Key to the Fields, 1936), *Le Domaine d’Arnheim* (*The Domain of Arnheim*, 1949), and, later, *Le Soir Qui Tombe* (Evening Falls, 1964).



Figure 5. ‘Le Soir Qui Tombe’ (Evening Falls, 1964).

In each of these we see a similar window in a similar room that has been shattered by some large object, leaving shards of glass inside the room leaning improbably upright along the wall beneath the window and on the windowsill. On these glass shards we see a near-exact reproduction of elements in the scene outside the room, creating the unavoidable impression that the outdoor scene had, indeed, been painted on the glass.

Le Soir Qui Tombe (1964, Fig. 5) and its earlier brethren are thus reasonably seen as Magritte’s not-so-subtle counterpoints to *La Condition Humaine* and a defiant answer to logical question implied by the heading of this section. If *La Condition Humaine* confronts us with a reality in the form of a scene, a visual and conceptual terrain which he has ‘mined’ with perceptual antonyms and paradoxes, *Le Soir Qui Tombe* (and variants) literally shatters that reality. Moreover, *Le Soir Qui Tombe* adds three more philosophical considerations to those raised in *La Condition Humaine*: *Agency*, *Causality*, and *Time*. Someone/something (agent) broke (causality) the glass, arranged the shards to appear improbably leaning upright against the wall and windowsill with the images on them all facing us (agent). In addition, in the case of *Le Soir Qui Tombe* (Evening Falls), Magritte has given us an implicit time-keeper in the painting: the distance between the setting sun and the hills forming the horizon are nearly identical in the scene outside the room and on the painted shards of glass inside the room, as if the window had been hastily shattered immediately after the sun had been added to the scene (we have to imagine a real setting sun being painted in this scenario).

However, Magritte’s design of *La Condition Humaine* biases our perception strongly against seeing the logical alternative implied by *Le Soir Qui Tombe* by carefully laying out the scene elements so as to elicit a vivid three-dimensionally-depicted space that spans a large range of perceived depth (from the front of the easel legs to the plane of the painting, to plane of the window, to the distant bushes and more distant hills, sky and clouds). The grass and distant green hills exhibit texture gradients and implied atmospheric haze commensurate with receding distance. Even a detail like the thin strip of grass that appears beneath the canvas serves as a strong cue to localize the grass outside the room, contiguous with the grass leading up to the dirt path. The outside scene thus remains firmly outside, refusing to collapse to the implied plane of the window.

In addition to the implied 3D layout of scene elements outside the window, several object features on the canvas and inside the room bias against a paint-on-window-glass perception: (i) The occlusion of the right edge of the left curtain by the edge of the canvas localizes it in front of the curtain, inside the room. Without this feature, the whole left edge of the canvas could more easily have been seen as belonging to the same plane as the window. This is readily seen in Fig. 4A, where the occluding strip of the canvas has been filled in with elements of the outdoor scene; (ii) The easel legs that we amodally link to the clamp at the top of the canvas (see text associated with Fig. 3) are convincingly localized inside the room, perceived as in front of the windowsill; (iii) The portions of the easel legs that extend above the sill into the region of the grass outside reinforces their localization inside the room, mitigating against interpretation of the entire scene within the window frame as having been painted on the glass.

Transparency vs Opacity: what these Competing Percepts Tell Us

Because any shift in percept between transparency and opacity occurs without a change in the stimulus, the competing appearances cannot be explained by the scene’s local or global image statistics and pure ‘bottom-up’ sensory signals (Ritchie and van Buren, 2020). Higher brain mechanisms that instantiate image segmentation and figure–ground assignment and 3D scene organization must be enlisted. Our cognitive understanding of the scene at any given moment, which changes depending on what

features we attend to, determines which we see — a transparent window-like structure or an opaque canvas. Ritchie and van Buren (2020) astutely pointed out that, depending on whether a scene element is perceived as figure or ground, our perception of the nature of the material properties of that element changes. In *La Condition Humaine*, when the canvas area is perceived as opaque, based on our priors, we perceive the canvas area as a material, a canvas covered with paint. which is quite distinct from the material properties of the alternative interpretation, i.e., transparent glass.

Other paintings by Magritte also illustrate this phenomenon quite vividly, such as Magritte's *Les Muscles Du Ciel* (Muscles of the Sky, 1927) and *Le Blanc-Seing* (The Blank Check, 1965; see Hamer, 2023). Hamer (2023) discussed the latter work, shown in Figure 6 below.

***Le Blanc-Seing* (1965): 3D Understanding of a Scene Distorts Familiar Objects**

In this striking painting, Magritte depicts a pastoral forest scene with a horse and a smartly dressed woman rider passing through a stand of trees. The scene has a certain tranquility: there is no evidence of wind disturbing leaves, branches or the woman's hat or clothing. It appears to be early autumn, with brown, orange and reddish leaves intermingled with the grass receding into the background between the trees. The painting evokes implied motion: the horse is in a jog or slow trot, based on its leg and hoof positions, and its upright stance. The source of light is from high to the right based on the shadow information at the base of the trees and horse's legs. Each element of the *Le Blanc-Seing* is painted masterfully and realistically, but otherwise, most of the scene is unremarkable at first glance: there are no melting clocks, as in Dali's famous *Persistence of Memory* (1931).



Figure 6. *Le Blanc-Seing* (1965) with five trees numbered as discussed in the text. An arrow illustrates the alignment of the bases of some of the trees along a rough perspective line receding towards the scene background.

Magritte's meticulous pictorial design in this masterpiece imbues the whole scene with a vivid, perceived 3-dimensionality, instantiating a depth hierarchy of all the elements in the painting by employing almost all the monocular depth cues.

There are three surreal elements of the painting, the most striking of which is a somewhat shocking gap in the front end of the horse. The gap is designed to be coincident with the opening Magritte depicted between two large trees (trees #1,2), and so we

seem to see between the trees, right through the horse, to the hazily depicted foliage and grass far in the background. A second glance reveals that this gap is behaving as an opaque occluder, blocking the rider's left hand and part of the reins as well as a huge chunk of the horse's front torso. The gap in the horse is thus bi-stably perceived as either open space in which we see textured background foliage in the distance, or as an opaque foliage-

textured, occluding ‘ribbon’ in the foreground, a material with unspecified properties other than its opacity.

There are several pictorial T-junctions that would tend to bias us to perceive the stippled foliage pattern in the region of the horse’s torso (in Fig. 6) as an occluding object (Nakayama & Shimojo, 1992; Nakayama et al., 1995; Rubin, 2001). They occur most notably at the right and left edges of the pattern where they exit the horse’s body at the top and bottom. However, unlike T-junctions in real occlusions of real objects, or images of objects (real or abstract), these T-junctions are unstable: they only act like “ordinary” T-junctions during the moments when our perception has “flipped” to see the foliage pattern as an occluding object. In

that state, the left and right vertical borders of this region are seen as crisp edges of an (occluding) object, not as open space between objects.

The other two surreal effects are associated with tree #3 which, at its base, is well behind trees #1 and #2, but which rises along a surreal (physically improbable) path to end up in front of those trees and the horse and rider as well.

It is easy to show that almost all these effects are induced by Magritte’s masterful construction of space in the scene. This is readily visualized if we replace everything in the scene, except for horse and rider, with black (Fig. 7A), or if we simply “correct” Magritte’s surreal constructions (Fig. 7B)



Figure 7. Surreal effects are eliminated if Magritte’s spatial construction is “corrected”. (A, left). When all but horse, rider, tree #3 and the gap in the front end of the horse are replaced with black, the surreal effects are eliminated. The left rear leg no longer seems inordinately long and distorted. The “gap” in the front end of the horse is seen as merely some sort of invisible occluding column. (B, right). Analogously, when tree #3 is moved from behind trees #1,2 to in front of the horse and rider, and the “gap” in the horse is corrected, all the surreal effects are now eliminated.

It is the very vividness of Magritte’s construction of depth in the scene that ‘warps’ even familiar objects: distortion of a familiar straight vertical tree into an unlikely convex tree; the horse’s left rear leg appears to be physically (oddly) stretched, elongated, winding impossibly from behind tree #3 to end up in front of tree #1 and the horse and rider.

Area V2 in visual cortex has been proposed to play a role in figure-ground segregation in that it contains cells that are “side-of-figure selective” (e.g., Zhou et al., 2000; Sugihara et al., 2011; Qui et al., 2005). However, it seems that the perception of this region of the painting cannot be explained simply by such mechanisms. The spatio-chromatic texture in this region of the painting can only “own the borders” during the moments when it is perceived as an occluding object, like a textured (opaque) surface. This percept is bi-stable to a greater or lesser degree from viewer to viewer and, across viewing time, for each viewer.

An additional surreal effect may emerge. After viewing this painting many times, the whole texture-become-occluder between

trees #1 and #2 can appear convex, curved toward us, since above and below the horse it is seen as distant background.

Magritte’s construction of this region of the painting engages the “middle-vision” mechanisms that prioritize the parsing of scenes into surfaces of objects (e.g., Nakayama et al., 1995). Yet this striking, surreal effect is unstable. The similarity between the spatio-chromatic texture in the region of the horse’s torso and the regions above and below the horse biases us to see it all as background, which ‘severs’ the horse. However, the amodal completion of the horse, reins and rider’s hand draws our perception back to seeing that same texture as an opaque occluder (like a textured opaque ribbon). This bi-stability cannot be explained by local image statistics *per se*. Thus, the competing perceptions of this region of the painting highlight our brain’s active mechanisms that instantiate image segmentation and figure-ground assignment. These, and not bottom-up image statistics, determine whether the stippled region in the middle of the horse is processed as a ‘material’ (opaque ribbon) or a ‘scene’ (background foliage) (Ritchie & van Buren, 2020).

Shadows Seen and Shadows Missing: Both Speak to Us, some Confuse

Shadows tell us about light sources and about the objects casting them, their structure and even trajectory in 3D space in the case of moving objects (Kersten *et al.*, 1997). In both *La Condition Humaine* and *Le Blanc-Seing* we find that some shadows Magritte depicted make sense, while some missing shadows often go unnoticed.

In *La Condition Humaine*, the thin shadow underneath the easel clamp imparts opacity to that region of the canvas, and, by implication, the rest of the canvas, another example a ‘perceptual amplifiers’.

The shadows behind the drapes and underneath the windowsill imply illumination by a single light source inside the room from above. But because the curtain’s shadows are cast toward different directions (slightly leftward for the left curtain, rightward for the right curtain), it implies that a single light source is roughly centered between the drapes and is relatively close to the drapes and the window.

We tend not to notice that there are no shadows from the easel legs nor a shadow that would be cast by the canvas onto the white window frame or the windowsill.

Some visible shadows appear to violate the implied lighting of the scene and are confusing. There are two small shadows at the base of the easel legs that extend at an angle along the floor *away* from the wall. These shadows make no physical sense given the illumination implied by the shadows of the curtains.

In *Le Blanc-Seing*, we see six shadows visible on the grass-leaf forest carpet: small horizontal shadows to the left of the base of four trees, plus two small shadows on the grass behind the left front and right rear hooves of the horse. The placement and length of these shadows imply sunlight coming from high up and to the right, shortly before or shortly after noon.

Magritte appears to have deliberately avoided depicting other shadows that ought to be visible. Missing are any shadows from the rest of the horse: no shadows from the head and torso, or from the elevated right front leg are depicted. There are no shadows on the

forest floor cast from the foliage or large branches above the horse and rider.

Yet these omissions tend to go unnoticed without methodical inspection of the painting details. As an artistic, aesthetic choice, this was probably a wise one. The six shadows he chose to display were simple and their “shadow ownership” (Casati & Cavanagh, 2019) was unambiguous: the objects that cast them were unambiguous, which is not always the case in complex scenes (e.g., shadows of foliage) (Casati & Cavanagh, 2019). Artists are masters at knowing what we will likely not notice, i.e., what omissions or errors or violations of physics and optics will pass unnoticed (Cavanagh, 2005), and what is essential to achieve the perceptual effect they seek.

On the other hand, two small shadows that Magritte was careful to include served an important perceptual function: the shadows behind the horse’s left front and right rear hooves. These two small shadows have outsized perceptual impact. Their presence anchors the horse and rider to the ground (the plane of the grass and leaves), imbuing weight to the horse and rider. Without these shadows, the horse and rider could seem to be floating above the ground. Moreover, it is possible that they exert their effect even if we do not consciously notice them.

Pictorial Inspiration for *Le Blanc-Seing*: ‘Cross-Medium-Pollination’

Following a hint by Sarah Whitfield (1992), I discovered fairly convincing evidence that the pictorial inspiration for *Le Blanc-Seing* (1965) could have come from a brief 5-10 sec scene in a 1924 silent German film by Fritz Lang, “Siegfried”.

Figure 8A is a still photograph, a screenshot, taken from a scene in the film that I found on Youtube starting at 15:15, and then captured at 16:11. Next to it (Fig. 8B) is the same image with a grayscale version of *Le Blanc-Seing* overlaid on top of the still-shot from the film



Figure 8. (A, left). Screenshot from Fritz Lang’s film “Siegfried” taken at 16’11”. (B, right). A grayscale version of *Le Blanc-Seing* is overlaid on top of the screenshot from Lang’s film.

The match between Magritte’s painting (1965) and the still-image from *Siegfried* (1924) is remarkable despite some differences (inexact alignment of the trees and different positioning of the horse). Nevertheless, the similarities are striking: even the odd hat on the woman’s head is similar to the hat or headpiece on

the horse-person’s head in the still-shot; the horse’s right front leg is in approximately the same position as the leg of the horse in the film; and three or perhaps four of the trees in the film image are roughly, if not exactly, aligned with trees in the painting.

Conclusion

Multiple perceptual and cognitive dualities are set into conflict with each other in Magritte's 1933 masterpiece, *La Condition Humaine*: an opaque painting behaves like a window, paradoxically revealing what it conceals; a scene exists alternately outside a room and near us inside a room, on a canvas.

Magritte's *Le Blanc-Seing* (1965) is an iconic masterpiece by Magritte. It is aesthetically striking, with beautifully rendered scene elements laid out in a meticulously constructed 3D scene. However, like *La Condition Humaine*, it also generated perceptual contradictions: a background element appears to sever a horse and is then seen as a foreground occluding object (foliage-patterned ribbon); familiar objects are distorted by Magritte's meticulous creation of, and then violation of perceived 3D space. These perceptual surprises elicit a surreal experience

Overall, the surreal effects in both paintings highlight that our perceptual understanding of surfaces and objects that "own" them, and their *spatial arrangements in a perceived 3D scene* are primary. This is especially clear when we view manipulated variations of *Le Blanc-Seing* (Fig. 7) in which many of the salient surreal effects disappear if their spatial context is either eliminated (Fig. 7A) or "corrected" (Fig. 7B).

In both works, subtle details exert amplified perceptual impact: the left corners of the canvas in *La Condition Humaine* impart opacity to the entire canvas. Tiny shadows behind two of the horse's hooves in *Le Blanc-Seing* anchor the horse and rider to the ground, imbuing them with weight.

Perceptual paradoxes also emerge in both pieces. In *La Condition Humaine*, small details elicit perceptual and conceptual paradoxes whereby an opaque canvas corner seems to reveal the outside scene, thereby propagating an implied transparency to the (opaque) curtain that it is blocking. In *Le Blanc-Seing*, vividly perceived distant foliage transforms, depending on our perception of the scene elements, into an opaque occluding object in the foreground.

In *Le Blanc-Seing*, Magritte sets up visual "traps" in an otherwise normal, tranquil forest scene with several shocking surreal effects. The meticulous spatial design of the scene sets up our visual scene-construction (scene-understanding) for some surprises when Magritte "messes with" figure vs ground and the spatial relationship between familiar objects, causing vivid perceptual distortions of familiar objects (a tree that is both far and near, becoming convex, and which imbues distortion the horse's anatomy).

Magritte's art thus draws us into reflections on perception, on what is seen and what is hidden, on the inescapable yet permeable boundary between the imagined and the real, into the provocative

conceptual territory in which he explores, and violates, our visual system's perceptual 'rules', or categories of objects, and even examines, almost as a scientist, the very nature of representation itself.

In this paper I highlight the perceptual impact, as well as some philosophical implications of conflicting percepts in Magritte's paintings. I discuss a kind of 'butterfly effect', what I termed 'perceptual amplifiers', where large perceptual interpretive effects result from tiny, often unnoticed, Gestalt factors brought into play by the artist. The focus on such pictorial details and their perceptual impact can enhance viewers' appreciation of these works by Magritte as well as other works of art.

Magritte considered himself a painter of ideas (Dubnick, 1980; Gablik, 1970; Paquet, 2015, p. 46), and so his works were those of a philosopher as much as an artist. *La Condition Humaine* clearly addresses fundamental philosophical dualities — interior vs exterior reality ('the problem of the window'), representation vs reality — and guides us to examine a universal 'mystery-of-the-ordinary', including our ubiquitous everyday experience of visible things hiding other visible things (Magritte, 1938a).

However, in Magritte's hands, the quotidian mystery is rendered more mysterious, rendered surreal, by the perceptual-conceptual conflict inherent in the 'reveal-what-is-concealed' construction of the painting. In *La Condition Humaine*, the exterior and interior trade places, a localization ambiguity, depending on how the canvas area is perceived. Thus, *La Condition Humaine* raises questions about the 'location' of perception and thought (Wargo, 2002, a topic Magritte discussed explicitly in relation to this painting).

Le Blanc-Seing is a less explicitly philosophical work, yet careful attention to detail Magritte laid out for us masterfully guides us to experience firsthand the hidden "brain rules" that govern our net perception of a scene. He does this by (almost mischievous!) violation of our visual system's rules and expectations.

Magritte's art engages us on perceptual, aesthetic, emotional, cognitive, philosophical and even unconscious levels, challenging expectation and simplistic views of the world, all animated by his belief in the 'mystery of the ordinary', his devotion to create visual poetry, to make thought visible and seduce us into novel intellectual/emotional territory by means of strategic use of 'poetic shock', the deliberate juxtaposition of related objects in unexpected contexts. Magritte's brand of Surrealism was notable in that his surreal effects were constructed with realistically depicted objects: "Because his images draw their material so often from normal daily experience, they are the more persuasive in their haunting suggestion...they make us conscious of the wonder of our own mind's speculation rather than of a personal realm of fantasy belonging solely to the artist" (Taylor, 1957)

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