

## Visuality After Gombrich: the Innocence of the Eye and Modern Research in the Philosophy and Psychology of Perception\*

For the past fifty years few books on art history have exercised an influence comparable to that of Ernst Gombrich's *Art and Illusion*.<sup>1</sup> Published in 1960, the book came to be regarded as the pivotal art historical articulation of the view that conceptual thinking, beliefs and expectations predetermine the totality of human perceptual experience – that there is no innocent eye, to use Gombrich's phrase. The view itself was not novel at the time: previously, during the 1920s and 1930s, it had been promoted in various forms by a number of German-speaking art historians and philosophers such as Dagobert Frey, Erich Rothacker and, arguably, Martin Heidegger.<sup>2</sup> The importance of Gombrich's contribution was partly in his comprehensive presentation of this view to English-speaking scholars and partly in the way he correlated it with the latest psychological research on human perception of his time (*Gestalt* and »New

Look« psychology) as well as with the then-influential views of his philosopher friend Karl Popper.

For a number of decades the debate about Gombrich's book has mainly concentrated on its position in the wave of cultural relativism that evolved during the 1960s and came to dominate English-speaking scholarship in subsequent decades.<sup>3</sup> If the totality of human perception is predetermined by available concepts, as Gombrich argued, and if concepts are acquired as a result of one's membership of a specific culture, then human perception has to be determined by one's membership in the collective that constitutes that culture. Further on, if no segment of perception is culture-independent, it follows that the totality of perceived reality is culturally constructed. Gombrich abhorred such collectivist and anti-realist interpretations of his book.<sup>4</sup> Nevertheless, since the book came out in the same decade as Willard

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<sup>1</sup> Ernst Gombrich, *Art and Illusion. A Study of Psychology of Pictorial Representation*, London 1960.

<sup>2</sup> Erich Rothacker's *Satz der Bedeutsamkeit* stated that only what is relevant and meaningful for a specific collective can be perceived or interpreted: »...erlebt, wahrgenommen, ausgedeutet, bearbeitet und wortinhaltlich differenziert wird *de facto* nur was für die betreffende Gemeinschaft in irgend einem Sinne bedeutsam und belangvoll wurde...« (Erich Rothacker, *Zur Genealogie des menschlichen Bewusstseins*, Bonn 1966, 44–48, here 44.) This view was endorsed by the art historian Dagobert Frey, who phrased it by saying that

»ohne erlebte Bedeutung keine Wahrnehmung«, Frey, *Kunstwissenschaftliche Grundfragen. Prolegomena zu einer Kunstphilosophie*, Vienna 1946, 33. In Frey's view, because of temporal-ethnic determinism (»zeitlich-volkhaften Bindung der darstellenden Gestaltung den Stoff« Frey, *ibid.*, 33), a Japanese and an European perceive differently. A similar understanding of visual perception is to be found in sections 15 and 31 of Martin Heidegger's *Sein und Zeit*, Tübingen 1993, 61–72 and 142–148. Heidegger insisted that our primary relationship with objects is not grounded perception, but rather in considering them as instruments, equipment. A hammer we use may have perceivable properties, but they remain unnoticed until there is a problem with its use – when the hammer, for instance, may need to be repaired. In other words, seeing is derivative of understanding. A good summary of Heidegger's views on this topic is in Harrison Hall, *Intentionality and world: Division I of Being and Time*, in: Charles Guignon, *The Cambridge Companion to Heidegger*, Cambridge 1993, 122–140.

<sup>3</sup> For a summary of these debates see Branko Mitrović, *A Defence of Light. Ernst Gombrich, the Innocent Eye and Seeing in Perspective*, in: *Journal of Art Historiography* 3, 2010, 1–30.

<sup>4</sup> See Jan Bakoš, *Introductory: Gombrich's Struggle against Metaphysics*, in: *Human Affairs* 19, 2009, 239–250 for a summary of Gombrich's attacks on collectivist

van Orman Quine's *Word and Object*, Hans Georg Gadamer's *Wahrheit und Methode*, Thomas Kuhn's *Structure of Scientific Revolutions*, Peter Berger's and Thomas Luckmann's *Social Construction of Reality* and Nelson Goodman's *Languages of Art*, it was originally widely read as part of the same wave of cultural determinism. In subsequent decades Gombrich made huge efforts to combat this interpretation of his views.

While Gombrich strongly related his views to contemporary scientific theories of vision, subsequent scholarship has made no attempt to discuss the implications of later developments in the psychology and philosophy of perception for the positions he articulated. Fifty years is a very long period in the history of twentieth century science. It is hard to imagine that the assumptions on which Gombrich based his arguments fifty years ago are fully credible in the same form today. The intention of this paper is to analyse Gombrich's views and arguments in the context of subsequent developments in the philosophy and psychology of perception.<sup>5</sup>

### *Innocence of the Eye*

Arguably, the common-sense view of human visuality is that one first perceives things and only then classifies that which one has seen: light reflected from an object first reaches my eyes and

historiography. For a discussion of the anti-realist interpretations of *Art and Illusion*, see Murray Krieger, *The Ambiguities of Representation and Illusion: An E. H. Gombrich Retrospective*, in: *Critical Inquiry* 11, 1984, 181–195. See also Gombrich's response, Ernst Gombrich, *Representation and Misrepresentation*, in: *Critical Inquiry* 11, 1984, 195–201, here 195. By the 1980s Gombrich became a target of systematic attacks by the proponents of cultural-determinist and anti-realist orthodoxy. See for instance Norman Bryson, *Vision and Painting. The Logic of the Gaze*, London 1985; Joseph Masheck, *Alberti's ›Window‹: Art-Historiographic Notes on an Antimodernist Misprision*, in: *Art Journal* 50, 1991, 34–41. Gombrich's irritation can be felt in his Preface to the 2000 reprint of *Art and Illusion*, Princeton 2000, 1. For an analysis of Gombrich's debates with anti-realists and cultural constructivists, see also David Blinder, *The Controversy over Conventionalism*, in: *The Journal of Aesthetics and Art Criticism* 41, 1983, 253–264, and Mitrović (as note 3).

I perceive the object; my brain then processes this percept and I recognise that I am perceiving a chair. According to this view, conceptualisation (classification) follows perception: you need to see first in order to grasp what you have seen.<sup>6</sup> Refuting this view in the realm of art history was the central aim of Gombrich's *Art and Illusion*.<sup>7</sup> In Gombrich's view, it is wrong to conceive of perception as a passive process, registration of data by the retina (172). Pure passive perception is simply not possible for the human mind and seeing is never merely registering (297). Perception is an active process, conditioned by our expectations; it can be described as the modification of anticipation – it is never independent of our expectations (172, 228, 298). »To see is always to see ›something out there‹« (260). Gombrich's thesis that there is no innocent eye thus implies that *all* of our visual experience is *always* determined by our capacity to conceptualise the contents of our perception – otherwise he would have to admit that human visuality is at least sometimes capable of passive reception.

The same understanding of human visuality is to be found in Gombrich's writings in later decades. In the Introduction to his 1979 book *The Sense of Order* he explains that there is no neat perception and that our cognitive apparatus places stimuli in prearranged slots.<sup>8</sup> The organisation of these slots is neither inborn nor regular. In

5 It is remarkable how little work has been done on the implications of the contemporary theories of vision for the methodology of art history. Consequently, the re-evaluations of Gombrich's positions from the point of view of contemporary psychological research are also very rare. One important exception is Ladislav Kesner's article *Gombrich and the problem of the Relativity of Vision*, in: *Human Affairs* 19, 2009, 266–273. Kesner suggests that new research may seem to support the historicity of vision, though it may be too early to draw definite conclusions. In this paper I present a different perspective – that research on non-conceptual content and the impenetrability of early vision makes the belief in the historicity of vision obsolete. The apparent disagreement between my and Kesner's paper derives from the fact that they pertain to different realms of psychological research: I discuss the constitution of visual-spatial experience while Kesner's interests concentrate on its conceptualisation. It should be noted that V. S. Ramachandran's and William Hirstein's article *The Sci-*

the 1974 essay »Mirror and the Map« he explicitly states that »there is no fixed correlation between the optical world and the world of our visual experience. ... There is the influence of past experience and of expectations, the variables of interest, ›mental set‹ and alertness, not to speak of variations in the observer's physiological equipment and in the adjustment of the perceptual system to changing conditions«.9 »Seeing, like representing, is a transitive verb and demands an object« (180). Similarly, in the 1978 essay »Image and Code« he reaffirms the view that »to perceive is to categorize, or classify«.10

Gombrich formulated his views on visuality largely under the influence of his philosopher friend Karl Popper. Popper conceived of perception as comparable to the scientific acquisition of knowledge: hypotheses precede observations and »it is through the falsification of our suppositions that we actually get in touch with ›reality«.«11 In the opening section of *Art and Illusion* Gombrich reports that Popper dubbed the idea that perception precedes conceptualisation »the bucket theory of mind« (28). Sense-data, untheoretical items of information cannot exist, Popper insisted; our

perception is always based on theories, some of which are even incorporated in our physiology. A sense-organ, he says, is comparable to a theory; it is impossible to separate observation from the theoretical elements of interpretation.12 Another important source of influence on Gombrich was contemporary psychological research.13 In the Introduction to *The Sense of Order*, he gave credit to *Gestalt* psychologists for being the first to oppose the understanding of perception as the passive registration of stimuli.14 He was also acutely aware of current trends in the most recent psychological research of his time. *Art and Illusion* was written in the heyday of »New Look« psychology. This stream of psychological research started in 1947 when Jerome Bruner established in his experiments that the value which people associate with physical objects affects their perception of the size of these objects, while the perception of unexpected objects (e.g. non-standard playing card such as a black three of hearts or a red two of spades) requires much more time than then the perception of expected objects.15 During the 1950s, Bruner's experiments stimulated a wave of similar research about the impact of

ence of Art. A Neurological Theory of Aesthetic Experience, in: *Journal of Consciousness Studies* 6, 1999, 15–51 mainly concentrates on the explanation of recognition in dealing with artworks; while the authors of another article cited by Kesner actually admit that their findings pertain to postperceptual processes (Angela H. Gutchess, Robert R. Welsh, Aysecan Boduroglu, Denise C. Park, Cultural differences in neural function associated with object processing, in: *Cognitive, Affective & Behavioral Neuroscience* 6, 2006, 102–109, here 107). For a wider perspective see David Freedberg, Empathy, Movement and Emotion, in: Franziska Nori and Martin Steinhoff (eds.), *Sistemi Emotivi. Artisti contemporanei ta emozione e ragione. Emotional systems. Contemporary Art between Emotion and Reason*, Milan 2007, 38–61.

- 6 The understanding of concepts as mental representations that encode classificatory criteria is typically referred to as the »classical theory of concepts«. See for instance Stephen Laurence and Eric Margolis, Concepts and Cognitive Science, in: Stephen Laurence and Eric Margolis (eds.), *Concepts*, Cambridge, Mass. 1999, 3–82, esp. 9–14.
- 7 See the Appendix to Mitrović (as note 3), for a survey of Gombrich's statements about the »innocence of the eye«.
- 8 Ernst Gombrich, *The Sense of Order. A study in the Psychology of Decorative Art*, Oxford 1979, 4.

- 9 Ernst Gombrich, Mirror and the Map: Theories of Pictorial Representation, cited according to Ernst Gombrich, *The Image and the Eye*, London/Ithaca 1982, 172–214, here 177.
- 10 Ernst Gombrich, Image and Code. Scope and Limits of Conventionalism in Pictorial Representation, cited according to Gombrich (as note 9), 278–297, here 286.
- 11 Karl R. Popper, *Objective Knowledge. An Evolutionary Approach*, Oxford 1972, 360.
- 12 Karl R. Popper, Is there an epistemological problem of perception, in: Imre Lakatos and Alan Musgrave (eds.), *Problems in the Philosophy of Science* (Proceedings of the International Colloquium in the Philosophy of Science, London 1965, vol. 3), Amsterdam 1968, 163–164.
- 13 For discussions of Gombrich's relationship with contemporary psychological theories, see Richard Woodfield (ed.), *Gombrich on Art and Psychology*, Manchester 1996.
- 14 Gombrich (as note 8), 4. For Gombrich and Gestalt psychology see also Richard Woodfield, Introduction to the debate, in: <http://www.gombrich.co.uk/dispute.php> [last accessed 1 November 2012].
- 15 The first of these experiments is described in Jerome Bruner and Cecile C. Goodman, Value and Need as Organizing Factors in Perception, in: *Journal of*

our beliefs and expectations on perception – a trend that came to be known as »New Look« psychology. As Ian Gordon observed, psychological literature of the 1950s »abounds in examples of perception being tricked in ways which reveal the involvement of knowledge, experience and familiarity... Publications of the time describe oddly-shaped rooms which appear normal when viewed through peep-holes, pictures and figures which are difficult if not impossible to decipher without verbal hints, delays in recognising briefly exposed words when these are threatening or taboo, and of course, many illusions. Showing the malleable and vulnerable aspects of perception under laboratory conditions increased the belief that this was how perception must be all the time.«<sup>16</sup>

The claim that the perception of objects is inseparable from their conceptual classification relies on the reasonable assumption that we do not perceive the actual image that the light rays produce on our retinas. The retinal image itself is certainly independent of our knowledge – it is created by the light rays that reach the retina from the object. However, substantial mental processing is necessary in order to convert the light stimulation of the retina into the phenomenal image that we perceive. After all, the image on the retina is upside down and, since most people have two functioning eyes, there are two images. But we do not see things upside down and we see only one image – consequently, our cognitive apparatus cannot be merely reproducing the retinal images.<sup>17</sup> Proponents of the idea that there is no innocent eye, that seeing is inseparable from classification (conceptualisation), use this fact to argue that the mental processes which constitute

*Abnormal and Social Psychology* 42, 1947, 33–44. Bruner and Goodman asked school children to adjust an iris-type opening on a mechanical device to the size of coins. The children substantially overestimated the size of coins – in the case of the quarter-dollar coin by 35% on average. It turned out that the social background of the children affected their responses: the children from less affluent background overestimated the size of coins by twice as much as those from affluent background. (A separate, »control«, group of children was asked to do the same with gray cardboard disks of the same size as coins; these children per-

our visual experience are thoroughly structured in accordance with our conceptual frameworks. The idea is that the construction of visual experience is thoroughly permeated by our conceptual thinking. The claim that »seeing« is always »seeing something« (or »seeing as«) means that we can only see what we can classify (conceptualise). In the words of the philosopher Marx Wartofsky, it is not that »in order to hit you, I must be able to see you« but rather, »if I see you, it is because I want to hit you«.<sup>18</sup>

The view that perception is inseparable from classification is nevertheless not philosophically unproblematic. Decades before Gombrich, or New Look psychologists, Edmund Husserl had warned that such a position ends up in infinite regress.<sup>19</sup> Husserl's point was that if one cannot perceive a white ball without classifying it as a white ball, then a white ball is perceived only insofar as it is similar to another white ball. This amounts to saying that one does not perceive specific things (properties), but rather their *similarity* to other things and properties. But then one has to say that such similarities themselves are perceived only insofar as similar to other similarities; and to perceive these further similarities one needs to perceive their similarity with other similarities, and so on *ad infinitum*.

### *Ambiguities of Perspective*

It was, however, not Husserl's finely tuned arguments, but the anti-realist implications of the view that there is no innocent eye that haunted Gombrich for decades after the publication of *Art and Illusion*. If one can perceive things only

formed their task with very good accuracy.) For the second experiment see Jerome Bruner and Leo Postman, On the Perception of Incongruity: A Paradigm, in: *Journal of Personality* 18, 1949, 206–223. In this experiment Bruner and Postman showed playing cards to their subjects – some usual ones, such as five of hearts, others non-standard, such as a black three of hearts. The result was that the recognition of non-standard playing cards took about three times as much time as the recognition of the standard ones.

<sup>16</sup> Ian Gordon, Gombrich and the psychology of visual perception, in: Woodfield (as note 13), 60–77, here 62.

because one classifies them in a certain way, then it is impossible to say that when perceiving e.g. a red and a blue circle, one perceives them as different because one sees their individual colours and then classifies one of them as blue and another as red. Rather, one sees the blue circle as blue and the red circle as red *because* one classifies them as such. But if we then ask *why* one classifies things as red and blue it turns out that this classification has to be *either* absolutely random *or* based on some properties of these things (e.g. they reflect light of certain frequency, which is perceived as colour). However, if the classification of objects depended on the properties they possess, one would have to perceive these properties *before* and *independently* of classification. The assumption that there is no innocent eye, that perception cannot be separated from classification precisely asserts that this is impossible. But then we have to conclude that our perception of things in the real world is independent of any properties of these things. The way things are is then utterly irrelevant for the way we see them. For the proponents of cultural constructivism that came to dominate the humanities in the final decades of the twentieth century, anti-realism of this kind meant that that what we perceive as reality is merely a social construct. If seeing is always »seeing as«, then seeing has to be a result of enculturation. Gombrich's constructivist opponents, such as Norman Bryson, argued that there is no other reality to be experienced beyond the reality that the social

processes construct.<sup>20</sup> Because of his commitment to defending perspective and realist art, Gombrich vehemently opposed this view. His concerns are understandable: if reality (the way we perceive it and what we know about it) is a cultural construct, then resemblance to reality becomes a social convention too; the similarity of perspective and realist paintings to possible visual experience becomes a social-historical category, rather than an optical one. On the one hand, Gombrich wanted to defend the transcultural validity of perspectival representation and realist painting—that their resemblance with the objects they represent is more than a mere cultural convention. On the other, he actually did state in *Art and Illusion* that there is no reality without interpretation (363). Obviously, if reality is a product of interpretation and thus dependent on the concepts one has received from one's own culture, it becomes hard to explain how similarity with that reality could be culture-independent. Not only perspectival images, but any art that would rely on representation understood as resemblance becomes a result of social conventions: depending on the interpretative context, any image can resemble anything. A perspectively correct representation cannot claim a privileged status when it comes to representing spatial reality.<sup>21</sup>

It was the philosopher Nelson Goodman who first took Gombrich to task for defending perspective, in his review of *Art and Illusion*.<sup>22</sup> Because Gombrich refused to discuss perspective

17 Similarly, although the area of the retina where optic nerve leaves the eye contains no receptor cells, we do not see a black hole in the area of this blind spot; the brain *fills in* our visual experience – it makes guesses on the basis of what is seen in the areas neighbouring to those of the blind spot (see Maurice Hershenson, *Visual Space Perception*, Cambridge 1999, 29–73). Further on, although we are not aware of it, our eyes are never stagnant – they move in rapid movements called *saccades* that take between a two-hundredth and a twelfth of a second. Between the saccades the eye pauses for a small part of a second and then jumps on another saccade. The eye is blind during saccadic movements and what we see, we see in the moments between them. While our phenomenal vision is continuous, it consists of disjointed snapshots that the brain puts together at high speed. (For an interesting account of experiments with saccadic

movements see John Grimes, On the failure to Detect Changes in Scenes across Saccades, in: Kathleen Akins (ed.), *Perception*, New York 1996, 89–131).

18 Marx W. Wartofsky, Perception, Representation and the Forms of Action: Towards an Historical Epistemology, in: idem., *Models: Representation and the Scientific Understanding*, Dordrecht etc. 1979, 188–210, here 195.

19 Edmund Husserl, *Logische Untersuchungen* (Husserliana, vol. XIX/1), The Hague 1984, 197–207, esp. 200–201.

20 Bryson (as note 4), 33.

21 See in particular the opening section of Gombrich's »Image and Code« (as note 10) for his own description of this theoretical quandary.

22 Nelson Goodman, *Art and Illusion; a Study in the Psychology of Pictorial Representation* by E. H.

as conventional, »his treatment of this subject is often puzzling«, Goodman concluded.<sup>23</sup> Gombrich's standard response to the view that perspective is a mere social convention was to point out that a perspectival representation typically evokes instant and effortless recognition.<sup>24</sup> To those who claimed that resemblance is merely a cultural category, he used to point to the animals that use visual resemblance to protect themselves from other animals (caterpillars looking like twigs, butterflies that appear to have eyes on their wings) or the cases in which animals are tricked by visual resemblance (decoy ducks, angler's bait).<sup>25</sup> An object (including a picture or a perspectival rendering) that resembles another object (a spatial disposition of objects) does so because it reflects and delivers to the eye a similar bundle of light rays. Perspective in that case is a geometrical method to construct, on a piece of paper, a drawing that will yield a bundle of light rays similar to that yielded by the depicted object(s). Such an understanding of perspective, Gombrich notes in his article »Western Art and the Perception of Space«, answers Erwin Panofsky's argument that the ability to read perspectival images is a product of cultural developments. Famously, in his »Die Perspektive als ›symbolische Form‹« Panofsky

claimed that because of the concave surface of the retina, we actually perceive straight lines as curved.<sup>26</sup> Since perspectival drawings represent straight lines as straight and not as curved, he further inferred that such drawings are not realistic, that they do not represent things the way we see them. The argument is fallacious, since a perspectival drawing is not intended to imitate the retinal image, but to deliver a bundle of light rays equivalent to the one that would be received from the object(s) it represents. As Gombrich points out, even if straight lines were perceived as curves, we would still have to trace them as straight on the paper in order to perceive them as curved.<sup>27</sup>

The claim that all representation is always conventional, was one of the central theses of Goodman's *Languages of Art*.<sup>28</sup> According to Goodman, a mode of representation counts as realistic in proportion to how stereotyped it is in a given social context (36). »Realistic representation, in brief, depends not upon imitation or illusion or information but upon inculcation. Almost any picture may represent almost anything« (38). Goodman was aware that in order to sustain this claim he had to dismantle the argument that a perspectival drawing represents by delivering to the eye the same bundle of light rays as the one that

Gombrich, [book review], in: *The Journal of Philosophy* 57, 1960, 595–599.

<sup>23</sup> Ibid., 598.

<sup>24</sup> Ernst Gombrich, *Visual Discovery through Art*, cited according to Gombrich (as note 9), 11–39, here 19. Similarly, Gombrich (as note 9), 198.

<sup>25</sup> Gombrich (as note 9), 24; Gombrich (as note 10), 286.

<sup>26</sup> Erwin Panofsky, *Die Perspektive als ›symbolische Form‹*, cited according to the version published in Erwin Panofsky, *Deutschsprachige Aufsätze*, Karen Michels and Martin Warnke (eds.), 2, vols., Berlin 1998, vol. II, 664–757, here 668–669. For Gombrich's views see Ernst Gombrich, *Western Art and the Perception of Space*, in: *Space in European Art, Council of Europe Exhibition*, exh. cat., Tokyo, National Museum of Western Art, Tokyo 1987, 16–28, here 19–20. For the same counterargument to Panofsky's thesis see also Genesis Ten Doesschate, *Perspective, Fundamentals, Controversials, History*, Nieuwkoop 1964, 46–56, esp. 49 and also Maurice Henri Léonard Pirenne, *Optics, Painting & Photography*, Cambridge 1970, 148–149. But I am unaware that such refutations of Panofsky's article were made before the 1960s – that is, forty years after its original publication. Considering

the number of scholars working in various fields to which Panofsky's influential article pertained, it is remarkable that it took such a long time to make the point that its central claims were wrong. His claim that the geometrical postulates of the Euclid's *Optics* differ from those required for the geometrical construction of perspective was thus refuted only in 1982 (C. D. Brownson, *Euclid's Optics and its compatibility with linear perspective*, in: *Archive for History of Exact Sciences* 26, 1982, 165–193) while the claim that before the Renaissance space was not conceived as homogeneous in 2004 (Branko Mitrović, *Leon Battista Alberti and the Homogeneity of Space*, in: *Journal of the Society of Architectural Historians* 63, 2004, 424–440).

<sup>27</sup> Gombrich, »Western Art« (as note 26), 20.

<sup>28</sup> Nelson Goodman, *Languages of Art: an approach to a theory of symbols*, Indianapolis/Cambridge 1976.

<sup>29</sup> For Goodman's errors see David Carrier, *Perspective as a Convention: On the Views of Nelson Goodman and Ernst Gombrich*, in: *Leonardo* 13, 1980, 283–287 (including the subsequent exchange, *Leonardo* 14, 1981, 86–87) and Branko Mitrović, *Nelson Goodman's Arguments against Perspective: a Geometrical Analysis*, in: *Nexus Network Journal* 15, 2013, forth-

would be received from the object(s) it represents (11). His book therefore opens with a series of geometrical arguments against perspective (10–19), in an effort to show that geometrically constructed perspectival drawings fail to deliver such bundles of light rays. With one exception, all Goodman's arguments are based on fallacious geometrical reasoning and mainly derive from a miscomprehension of the concept of picture plane.<sup>29</sup> Nevertheless, although the book originally had a number of devastating reviews (Rudolf Arnheim equated Goodman to »a chemist who used art works to illustrate the difference between paper and canvas« while the reviewer in *The Philosophical Quarterly* compared him to »a vehemently Marxist stockbroker«) nobody seems to have noticed Goodman's errors about perspective for more than ten years, until David Carrier published his analysis.<sup>30</sup>

It is, however, the one argument that was *not* geometrically wrong – the so-called *ambiguity argument* – that interests us here. Assume that a perspectival representation indeed delivers to the eye a bundle of light rays matching the one received from the object itself.<sup>31</sup> The problem is then that the same bundle of rays could be also received by the eye from any multitude of differ-

ent dispositions of shapes in space. Goodman infers from this that identity in the pattern of light rays does not constitute a sufficient condition for representation. In his »Mirror and Map« Gombrich presents the same argument by saying that »while we can work out what the projection of a given three-dimensional object will be like on a given plane, the projection itself does not give us adequate information about the object concerned, since not one but an infinite number of related configurations would result in the same image«. <sup>32</sup> In »Western Art and the Perception of Space« he states an example: while a horizontal square-tiled floor projects a picture according to the laws of perspective, the two-dimensional projection is insufficient to establish that the floor is indeed horizontal and composed of square tiles; it might have been inclined and composed of trapezoids of various shapes.<sup>33</sup>

It took a stroke of genius, however, to convert this same argument that Goodman used *against* perspective into an argument showing that *although* all human perception is conceptually driven, perspective is *not* a cultural convention. The point, Gombrich thus responded to Goodman, is precisely that a perspectival rendering can represent an infinite number of different spatial

coming. Similarly, David Topper in *On the Fidelity of Pictures: A Critique of Goodman's Disjunction of Perspective and Realism*, in: *Philosophia* 14, 1–2, 1984 187–197 and also, without mentioning Goodman directly, but criticising his arguments, idem, *Perspectives on perspective: Gombrich and his critics*, in: Woodfield (as note 13), 78–99, here 85. Also, Michael Kubovy, *The Psychology of Perspective and Renaissance Art*, Cambridge 1986, 122–126 and Mitrovic (as note 3), note 54.

30 At least I have not managed to find a mention of Goodman's perspectival errors in the reviews I have consulted. Rudolf Arnheim, *Painted Skies and Unicorns – Languages of Art. An Approach to a Theory of Symbols* by Nelson Goodman [book review], in: *Science*, New Series 164, 1969, 697–698; B. C. O'Neill, *Languages of Art: An Approach to a Theory of Symbols* by Nelson Goodman [book review], in: *The Philosophical Quarterly* 21, 1971, 361–372; Wolfgang M. Zucker, *Languages of Art, an Approach to a Theory of Symbols* by Nelson Goodman [book review], in: *The Art Bulletin* 52, 1970, 223–224; Monroe C. Beardsley, *Languages of Art: An Approach to a Theory of Symbols* by Nelson Goodman [book review], in: *Philosophy of Science* 37, 1970, 458–463; Daniel Rigney, *Lan-*

*guages of Art: An Approach to a Theory of Symbols* by Nelson Goodman [book review], in: *Contemporary Sociology* 8, 1979, 319–320; Annette Barnes, *Languages of Art: An Approach to a Theory of Symbols* by Nelson Goodman [book review], in: *Perspectives of New Music* 9, 1971, 330–340; Christiana M. Smith, *Symbolic Systems, Cognitive Efficacy, and Aesthetic Education. Languages of Art: An Approach to a Theory of Symbols* by Nelson Goodman [book review], in: *Journal of Aesthetic Education* 3, 1969, 123–136; Nicholas Wolterstorff, *Languages of Art* [book review], in: *The Journal of Aesthetics and Art Criticism* 34, 1976, 491–496; Michael Thompson, *Languages of Art: An Approach to a Theory of Symbols* by Nelson Goodman; *Laws of Form* by C. Spencer Brown [book review], in: *Leonardo* 7, 1974, 175–176. For Carrier see Carrier (as note 29).

31 Goodman (as note 28), 11.

32 Gombrich (as note 9), 191. See similarly Ernst Gombrich, *The »What« and the »How«: Perspective Representation and the Phenomenal World*, in: R. Rudner and I. Scheffler (eds.), *Logic and Art: Essays in Honor of Nelson Goodman*, Atascadero, Calif. 1972, 129–149.

33 Gombrich (as note 26), 15.

dispositions of objects—but that we read it as a representation of one of them. It is through the selection of one interpretation out of many that our conceptual knowledge exercises a decisive impact on our visual experience. A good illustration of this explanation is an experiment made by Adalbert Ames.<sup>34</sup> Ames placed a disposition of wires organised according to the laws of perspective into a box. The wires could have been, for instance, disconnected, but they were arranged so that they were perceived to be in continuation with each other. They were positioned to look like a chair made of wire when seen through a peephole. In »Mirror and Map« (1974) Gombrich discussed, but was still hesitant to endorse, the view that we rely on our past (conceptual) experience when we choose one interpretation of a perspectival picture from many. A dozen years later, in »Western Painting« he explicitly adopted this view; in the example of the square-tiled floor mentioned above, he says that we perceive the floor as horizontal and the tiles as square because of our expectations.<sup>35</sup> It is our familiarity with the shapes of objects that helps us organize our visual experience into a spatial one.<sup>36</sup> Perspectival projection, his argument allows one to conclude, is thus optically defined by the geometry of light – it is not a cultural convention. Nevertheless, our ability to read perspectival drawings fully depends on our conceptual capacities; there is no innocent eye.

The solution is ingenious, but it has not been confirmed by subsequent psychological research. The important point, as modern research on

human visuality shows, is *not* that our vision depends on conceptual knowledge in order to select the correct disposition of objects from a pool of possible interpretations of what we see. The assumption that accurate information about the disposition of objects in the world is inferred from our knowledge about the world has been replaced with the understanding that the brain computes the disposition of objects in space from the picture it receives, while relying on specific constraints and rules about the possible and likely three-dimensional properties of spatial objects.<sup>37</sup> By this time, psychologists have studied and established a substantial inventory of such rules and constraints. For instance, various combinations of lines that represent corners are analyzed using interpretative constraints in a way that results in the elimination of all but spatially possible dispositions of lines meeting in a corner. In 1998, Donald Hoffman listed thirty-five different constraints that the brain uses in order to organise our visual experience – for instance: a straight line in an image is always to be interpreted as a three-dimensional straight line; if the tips of two lines coincide in an image, they are to be interpreted as coinciding three-dimensionally; lines collinear in an image are interpreted as three-dimensionally collinear; elements near each other in an image are interpreted as three-dimensionally close; a curve that is smooth in an image is interpreted as smooth in three dimensions.<sup>38</sup> These principles constitute built-in (hard-wired) constraints used by the brain to calculate the spatial disposition of objects from the information that light rays pro-

34 Gombrich (as note 9), 192.

35 Gombrich (as note 26), 15.

36 Ibid, 17.

37 A good account is in Zenon W. Pylyshyn, *Seeing and Visualizing. It's not what you think*, Cambridge, Mass. 2006, 94–120.

38 Donald D. Hoffman, *Visual Intelligence. How We Create What We See*, New York 1998, 24–171. See also the account in Pylyshyn (as note 37), 94–123.

39 See for instance Gordon (as note 16), 62.

40 The standard view of experimental psychologists is that although the projection of an object on the retina can have different shapes if the object changes its slant, »the object appears to retain its shape« (Hershenson

[as note 17], 118); that »perceived shape usually corresponds to objective shape« (D. W. Massaro, The perception of rotated shapes: A process analysis of shape constancy, in: *Perception and Psychophysics* 13, 1973, 413–422, here 420); that shape (or size) constancy is the phenomenon in which the percept of the shape of a given object remains constant despite changes in the shape of the object's retinal image (Zygmunt Pizlo, A theory of shape constancy based on perspective invariants, in: *Visual Research* 34, 1994, 1637–1658, here 1637); that »we see them [objects] not in shapes indicated by the laws of perspective but in the shapes which these figures ›really‹ possess« (Robert Thouless, Phenomenal regression to the Real Object, in: *British*

vide us with when they reach the retina. For instance, in the case of Ames' experiment, such principles guide one to select a specific disposition of wires as the interpretation of what is seen – and they result in inaccurate interpretation. If the tips of two wires coincide when seen through the peephole, it is assumed that they coincide in space, although this is not the case. This spatial interpretation derives from the interpretative constraints the brain operates with and not from our conceptual knowledge. The fact that the image looks like a known object is irrelevant; the brain first sorts out what it regards as the spatially credible disposition of wires and only then can one conceptualise what has been perceived. As we shall see later in this article, modern research shows that such spatial thinking is impenetrable to and unaffected by our concepts, beliefs and knowledge.

### *Constancies*

Insofar as perspectival drawings replicate the bundles of light that would reach our eyes from the objects they represent, they are defined by objective, physical laws. Similarly, the retinal image is generated by the light that enters the eye and is therefore defined by physical laws. However, this does not mean that we *see* in perspective, that the phenomenal image generated by the human brain follows the laws of perspective. A substantial body of psychological research on the phenomenon of *constancies*, that has been proliferating since the early decades of the twentieth century, suggests that the spatial organization of human visual experience (the image generated by the brain) can sometimes be very different from,

but also sometimes very similar to an image generated by the principles of perspective. The phenomenon of constancies pertains to situations when an object's shape or size are accurately perceived although they should not be, according to the laws of optics and perspective. Psychological research suggests that although the visual angle an object takes within a visual field shrinks with the increased distance of that object, most people perceive the size of the object to remain the same.<sup>39</sup> In other words, according to psychologists, the visual experience of most people tends to follow the real size and shape of objects, regardless of the distance or slant of these objects.<sup>40</sup> The literature thus states that two identical chairs perceived at respective distances of 12 and 6 meters are perceived as being of equal size.<sup>41</sup> In the case of circular plates on a dinner table seen from aside, psychologists state that »when we look obliquely at a circular object, we see it not as an ellipse but as a true circle.«<sup>42</sup> As a result, seen from aside, a plate looks like what it »really« is, circular and not elliptical, as its retinal image would suggest.<sup>43</sup> Another example of constancies that is often cited pertains to the way an approaching person is perceived. As the person comes closer, from a distance of ten yards to a distance of five yards, psychologists say that most people will not perceive that the visual image of the person grows in size, but that the visual image remains approximately the same.<sup>44</sup>

The further an object from the eye, the smaller is the angle of the visual field it takes; proportionally, its retinal image also grows smaller with increased distance. In psychological literature, the perception that follows the retinal image (i.e. changes in visual angle) and consequently obeys

*Journal of Psychology* 21, 1931, 339–359, here 339). »The perceptual constancies have in common that phenomenal experience is more in accord with the external object than with the proximal stimulus or at least with that aspect of the proximal stimulus considered most relevant.« (Irvin Rock and William McDermott, The perception of visual angle, in: *Acta Psychologica* 22, 1964, 119–134, here 119). A useful historical survey of the four most significant approaches to the problem of constancies is in Pizlo (as note 40).

41 Doesschate (as note 26), 74.

42 Thouless (as note 40), 339.

43 *Ibid.*, 339. Similarly Wolfgang Köhler, *Gestalt Psychology*, New York 1947, 45; William James, *Principles of Psychology*, New York 1890, 180. A historical survey of psychological research on constancies is in William Epstein, Historical Introduction to the Constancies, in: William Epstein (ed.), *Stability and Constancy in visual perception: mechanisms and processes*, New York 1977.

44 Köhler (as note 43), 44. Similarly, Gombrich (as note 26), 22.

the laws of perspective is called *proximal perception*. The literature also points out that for most people the apparent size of objects may change scarcely at all when distance changes; the term »size constancy« suggests that the perceived size is constant even though this need not be the case with the visual angle.<sup>45</sup> Perception that follows the real size of objects and is independent of the visual angle is called *distal perception*.

Gombrich returns to the topic of constancies over and over again, and he discusses the standard examples from psychological literature: that the perceived size of a person approaching us in the street does not grow as the person comes closer, or that circular plates seen at an angle on a table are perceived as circular.<sup>46</sup> He was well informed about the current research on the topic, and also strongly influenced by the *Gestalt* psychologists' views in these matters. For the gestaltists, emphasis on constancies was one of the central arguments in their struggle against (what they called) introspectionism – the view that one should differentiate between pure sensation and perception (the latter understood to include knowledge). The introspectionist approach to perception strove to reconstruct the original sensation as independent of our knowledge or beliefs, which were seen as accidental aspects of our experience that are irrelevant for perception.<sup>47</sup> This position implied that, strictly speaking, it is not correct to say that one

sees a book or a desk: what one sees are bundles of light rays reflected by some objects – whereas in order to say that one sees a book or a desk, one needs also to recognise what the object is.<sup>48</sup> *Gestalt* psychologists aimed to redirect psychological research from the study of artificially isolated sensations to immediate spontaneous perception of everyday experience. As William Epstein described, »Whereas the introspectionist tried to strip away the constancies so that the genuine sensory core could be observed, the Gestalt psychologist considered the constancies in perception to be the primary data.«<sup>49</sup> One of the founders of Gestalt psychology, Wolfgang Köhler, stated that »objects exist for us only when sensory experience has become thoroughly imbued with meaning«<sup>50</sup> – and it is not hard to see the attraction of such a position for those art historians who wanted to argue, like Gombrich, that there is no innocent eye.

Constancies need not be understood to contradict the optical validity of the geometrical construction of perspectival representations, such as drawings and paintings. Gombrich regularly reminds that the »effortless recognition« of perspectival representations is accompanied by the restoration of constancies.<sup>51</sup> He points out that few realist painters use strict geometrical construction when painting a still life or a landscape. Rather, they endeavour to reproduce in painting

45 A. H. Holway and E. G. Boring, Determinants of apparent visual size with distance variant, in: *American Journal of Psychology* 54, 1941, 21–37, here 21.

46 For Gombrich's sources on constancies see Gordon (as note 16). Gombrich, *Visual Discovery* (as note 24), 18–24; Gombrich (as note 26), 22.

47 For a summary of Köhler's arguments see his *Gestalt Psychology* (as note 43) as well as Epstein (as note 43), »Historical Introduction«. Köhler (ibid.), 43.

48 Köhler (as note 43), 2.

49 Epstein (as note 43), 2.

50 Köhler (as note 43), 44.

51 Gombrich, »Visual Discovery« (as note 24), 19. See also his discussion in »Western Painting« (as note 26), 22.

52 Gombrich, »Visual Discovery« (as note 24), 19; Gombrich (as note 26), 22–23;

53 Gombrich, »Visual Discovery« (as note 24), 21; Gombrich (as note 10), 280–281.

54 Gombrich (as note 9), 201. As Woodfield (as note 13) in the »Introduction«, 1–27, 14 stated: »If the world

actually did look like cubist painting, we would have enormous difficulty in getting around it, and if the world looked as if it was depicted in twelfth-century pictures, archers would have no difficulty in shooting their pray around corners.«

55 It is interesting to consider in this context the discussion about the way railway tracks are perceived. According to one view, straight railway tracks should be seen as converging in distance: their posts are all equal and the further they are the smaller they appear. Goodman actually used the convergence of railway tracks in distance in one of his embarrassingly erroneous arguments against perspective: he argued that it is not clear why vertical electric posts, which are also parallel, are not drawn as converging. (Goodman [as note 28], 16.) Marx Wartofsky, however, claimed that »parallel lines going off into the distance appear, in normal binocular vision, to be just what they are—parallel lines going off into the distance, without convergence.« (Marx Wartofsky, *Rules of Representation*:

what they see: they look at the object and paint it. In order to be able to reproduce things in a painting the way they are seen, painters have to be able to observe *without* constancies: they have to be able to see visual objects relative to the angle of the visual field these objects occupy. If human perception always strictly followed the principle of constancies, this would never be possible. Gombrich says that visual artists possess the skill to perceive according to the size of the visual angle, to »break constancies« by measuring the apparent size of an object (i.e. the relative size of the section of the visual field taken by the object). Proximal perception enables them to produce drawings that can be appropriately interpreted, *with* constancies, by people who look at them.<sup>52</sup> Visual experience without constancies reproduces geometrical relationships between all visual angles of all objects seen from a certain point in space. Such perception also accurately reproduces the occlusion of objects in accordance with the fact that light rays travel along straight lines. In visual experience that includes constancies, one supposedly sees the same two objects at different distances as the same in size – which means that the more remote object must be occluding some neighbouring objects even though light may be reaching the eyes from those objects. Gombrich called the exact, point-by-point mapping of what the eye would see from a certain point in space, (assuming that light travels in straight lines) the »eye-witness« principle.<sup>53</sup> Occlusion in human perception became Gombrich's central proof that

visual experience can follow the visual angle – in other words, the principles of perspective. He thus reports an experiment with three small cardboard trees that were aligned so that one occluded another, in order to show that the principle of occlusion does operate in human vision according to the geometry of light rays.<sup>54</sup>

In making this point, Gombrich was up-to-date with the psychology of his time. That the gestaltists' emphasis on constancies yields but a partial understanding of human visuality was not unknown at the time. After all, many of us perceive circular plates seen at a slant as elliptical, and chairs or people further away as smaller than those closer to us.<sup>55</sup> It seems fair to say that we *perceive* slanted circles as ellipses, but that we *know* they are circles – a view that, psychologists report, is often stated by psychology freshmen.<sup>56</sup> It is enough to hold one's hand next to the line of sight of a chair across the room in order to see that the image of the chair appears to be smaller than that of the hand.<sup>57</sup> The 1931 experiment by Robert Thouless was among the first attempts to resolve this dilemma. Thouless presented tilted circles to his subjects and asked them whether they saw a circle or one of the ellipses from a given catalogue.<sup>58</sup> The subjects reported that they saw ellipses, but the ellipses they selected in the catalogue were closer to a circle than the ellipses they should have seen according to the laws of perspective. In other words, they reported to have seen a compromise between the real shape of the object and what the laws of perspective suggested; the

The Virtues of Constancy and Fidelity put in Perspective, in: idem [as note 18], 211–230, 217.) Among psychologists, there exists a remarkable disagreement about the way railroads are perceived. Irvin Rock thus observes that »If we stress constancy of size, as has been tried in the literature since the Gestalt revolution, we cannot explain the vivid impression of convergence that every observer will tell you he has«. (Irvin Rock, In Defence of Unconscious Inference, in: Epstein [as note 43], 321–372, here 347. In line with this statement, Don McCready (On size, distance, and visual angle perception, *Perception and Psychophysics* 37, 1985, 323–334, here 323) talks about »the paradox of converging parallels«. According to V. R. Carlson, the hypothesis is that railway tracks are »perceived to be parallel and

never meet but are cognitively interpreted to converge«. (V. R. Carlson, Instructions and Perceptual Constancy Judgments, in: Epstein [as note 43], 217–254, here 220.) She also cites J. J. Gibson (220), in whose view, »an object can apparently be seen with approximately its true size as long as it can be seen at all«. Another view, mentioned by Alberta Gilinsky, is that railroad tracks are »now seen to converge, now seen not to converge«. (Alberta S. Gilinsky, The Effect of Attitude upon the Perception of Size, in: *The American Journal of Psychology* 68, 1955, 173–192, here 174.)

56 Köhler (as note 43), 50; Rock (as note 55), 347.

57 For this argument see Carlson (as note 55), 218.

58 Thouless (as note 40).

result was rather »a tendency to constancy« than the proper constancy of size.<sup>59</sup> An important point is that if subjects are to see circles and not ellipses when they look at tilted circles, they must somehow *know* that they are looking at circles. Though subjects' perception was thus, arguably, affected by their knowledge. In 1941 A. H. Holway and E. G. Boring examined what happens when information about the shape, size, distance and slant of the perceived object is gradually reduced. The result was that constancies were reduced to zero.<sup>60</sup> In subsequent decades, similar experiments yielded similar results: when cues that enable the subjects to determine the distance, shape and slant of the object are removed, the subjects' perception follows the visual angle.<sup>61</sup> J. Langdon thus established that constancy disappeared when the cues of depth have been removed;<sup>62</sup> H. Leibowitz and L. E. Bourne discovered that constancy disappears if the object is exposed to light for very short periods of time, such as one tenth of a second, while William Epstein established that full constancy requires exposures longer than half a second.<sup>63</sup> Leibowitz also discovered that subjects with higher intelligence paid less attention to constancy in their perception.<sup>64</sup>

All this research goes hand in hand with Gombrich's view that human perception sometimes reports the visual angle and sometimes repro-

duces constancies. During the 1950s, experimental psychologists also realised that the perception that subjects reported is affected by the instructions that were given to them. As Leibowitz and L. O. Harvey observed, the most effective experimental variable in size constancy experiments are the instructions given to the subjects.<sup>65</sup> In 1958 R. B. Joynson made a study about the subjects' understanding of the expressions »apparent size« and »look the same size«.<sup>66</sup> It was found that the majority of subjects understood »apparent« as different from the objective size. Three years before Joynson, Alberta Gilinsky examined the ability of subjects to compare objects at great distances by giving them two kinds of instructions: »objective instructions« that pertained to the estimation of the objective size of the object and »retinal instructions« that pertained to the apparent visible size of the object.<sup>67</sup> Such different instructions produced results that manifested clear difference between the two attitudes in observation.

It is thus fair to say that psychological research confirms Gombrich's views about constancies. It is understood that human visuality is somehow dual: we can perceive in terms of objective sizes and shapes or in terms of the visual angle; though in the case of many people, bringing this latter attitude to attention may require effort. Gom-

59 Ibid., 353

60 Holway and Boring (as note 45).

61 See Gilinsky (as note 55), 173 for a summary.

62 J. Langdon, The Perception of a Changing Shape, in: *Quarterly Journal of Experimental Psychology* 3, 1951, 157–165.

63 H. W. Leibowitz and L. E. Bourne, Time and Intensity as Determiners of Perceived Shape, in: *Journal of Experimental Psychology* 51, 1956, 277–281; William Epstein et al., Perceived shape at a slant as a function of processing time and processing load, in: *Journal of Experimental Psychology* 3, 1977, 473–83.

64 H. W. Leibowitz, I. Waskow, N. Loeffler, F. Glaser, Intelligence Level as a Variable in the Perception of Shape, in: *Quarterly Journal of Experimental Psychology* 11, 1959, 108–112.

65 H. W. Leibowitz and L. O. Harvey, Effect of instructions, environment, and type of test object on matched size, in: *Journal of Experimental Psychology* 81, 1969, 36–43; cited according to Carlson (as note 55), 217.

66 R. B. Joynson, An experimental synthesis of the Asso-

ciationist and Gestalt accounts of the perception of size, in: *Quarterly Journal of Experimental Psychology* 10, 1958, 65–76 and 142–154. Cited according to Carlson (as note 55), 236.

67 Gilinsky (as note 55). It is interesting to consider the outcome of Gilinsky's experiment. She presented her subjects with two objects. One was a large triangle placed at a distance of 100 feet and whose visible size could be changed by rising it from or lowering it into a pit. The other object was a similar triangle of unchangeable size that was placed at distances that varied between 100 and 4000 feet from the observer. The subjects were asked to adjust the size of the changeable triangle to the unchangeable one. Some subjects were instructed to achieve objective matches of size, others to match the visual angle. The results of those whose instructions pertained to objective matches did not follow strictly the rules of size constancy while the responses of the subjects who were asked to adjust the visual angle showed a higher level of consistence. In this latter case, the statistical stan-

brich described that artists have to »break« constancies—and in psychological literature one often reads that attention to the perception of the visual angle is typical of visual artists.<sup>68</sup> The psychologists Irvin Rock and McDermot thus say that although we do not see our retinal image we see in terms of it;<sup>69</sup> in their view, the gestaltists' emphasis on constancies was excessive (132). In a recent book that surveys the modern understanding of human visuality, Maurice Hershenson differentiates between »object or linear size« and »extensivity or visual angle size«.<sup>70</sup> He points out that visual angle size, or the proportion of the visual field that the object covers, is only brought into awareness with effort.<sup>71</sup> In an extensive survey of research on constancies published in 2002, the psychologist Dejan Todorović differentiated between the distal, proximal and phenomenal domain of human visual perception.<sup>72</sup> The *distal* domain consists of the outside world and its objects; the *proximal* domain is the optical projection of the external world on the retina, while the *phenomenal* domain is the conscious visual awareness of the world (126–127). According to Todorović, the standard view in contemporary psychology is that »perceived (or phenomenal) size« has two senses: the conscious impression of the distal size of environmental objects (the size as measured by measuring tapes), and the conscious impression of pure visual extent, or the amount of visual field covered by an object. Todorović suggests that this second sense is less

commonly used. It is, nevertheless, in this second sense that one says that »distant objects appear smaller«. The proximal sense can be noticed and attended to, once it is pointed out, although for most people everyday perceptions are based on the distal model.

### *Non-conceptual content*

Fred Dretske's 1969 book *Seeing and Knowing* was the first significant philosophical attempt to oppose the view that perception is inseparable from conceptualisation.<sup>73</sup> Dretske's efforts in the book largely concentrated on showing that perception can be independent of our beliefs. His assumption is that there is no conceptualisation without beliefs: insofar as my seeing a cat depends on me being conceptually aware that what I see is a cat, then the fact that I perceive a cat must also be inseparable from my belief that I am seeing a cat.<sup>74</sup> Having made this point, Dretske claims that there is a primitive visual ability that is independent of how we conceptualise what we see and which we share with a »cocker spaniel or a pet cat« (4). People can see maple trees without thinking that they see a tree or even a physical object, he says (6). When people sometimes say: »I do not know whether I really saw something or I imagined it« their perception is obviously not accompanied by any identifying belief. Similarly, it is hard to imagine that a dog's ability to see a scene depends on the dog's beliefs: rather, it depends on

standard deviation was lower and the agreement between subjects was more determinate and less individualized (187). Gilinsky concluded that the distinction »between *perception* (immediate experience) and *estimation* (knowledge and inference) may still be pertinent despite the explanation offered by Gestalt psychology« (187). In any case, her experiment clearly showed that the instructions given to the subjects can induce a radically different attitudes to perception.

68 Kirk Ludwig, Explaining why things look the way they do, in: Akins (as note 17), 18–59, 50; Bruner and Goodman (as note 15), 35; Rock and McDermot (as note 40), 132.

69 Rock and McDermot (as note 40), 119. See also Rock (as note 55).

70 Hershenson (as note 17), 116.

71 Ibid., 116. But he also describes continuous perspective

transformations that result from a movement around the object and directly denies constancies: »A stationary surface at a slant to a viewer project onto the proximal stimulus as a perspective transformation of the outline shape of the surface. When a viewer moves around the stationary surface, or when the distal surface is in motion, there is a continuous change of the perspective transformation in the proximal stimulus.« (154)

72 Dejan Todorović, Constancies and Illusions in Visual Perception, in: *Psihologija* 35, 2002, 125–207, here 125

73 Fred Dretske, *Seeing and Knowing*, Chicago 1969. See especially the section »Non-Epistemic Seeing«, 4–75.

74 Obviously, I may see something that looks like a cat but not believe that it is a cat. In that case I would be recognizing that I am seeing something that looks like a cat and would believe that I am seeing something that looks like a cat, though I would not believe that it is a cat.

the excellence of the dog's eyes, the distance of the scene and so on (15).

A proponent of the view that there is no innocent eye would have denied the validity of these examples. Among analytic philosophers, Dretske's book initiated an entirely new field of research in epistemology and the philosophy of perception which flourished during the late 1980s and through the 1990s. The study of the ways in which perception can have content independent of the concepts associated with that content came to be known as the debate about »non-conceptual content«.75 Additional support for this research came from the latest psychological research on the perception of animals and children before they learn to speak. It is often hard to deny that animals perceive things similarly to humans, while one is sometimes hesitant to attribute them the possession of concepts or beliefs that humans possess.76

Human perception and its contents, it has often been pointed out in research about non-conceptual content, are much richer and fine-grained than any available conceptual frameworks.77 The human mind often does not have concepts for all the nuances of the same colour that a human eye can differentiate. Some sections of mountains may be perceived as rounded, others jagged; nevertheless, visual experience is far more specific than such a verbal description can indicate.78 Similarly, a person need not possess the concept of symmetry in order to perceive the symmetry of

an inkblot (120). A well-known argument came from the British philosopher Tim Crane.79 Crane's starting point is that a person cannot have contradictory beliefs—for instance, believe at the same time that a thing is moving and staying still. Situations when a thing is perceived to move and stand still at the same time consequently indicate perception independent of one's beliefs. This happens indeed if, for instance, one stares for a period of time at a scene which contains movement in one direction, and then looks at a scene which contains no movement. It will appear that objects in this latter scene move in the opposite direction to that of the original movement, and at the same time, they will appear not to move relative to other objects in the scene. (Such contradictory perception occurs when one stares at a waterfall and then turns one's sight to some stationary object. The latter then appears to move, although not relative to its background.) Obviously, such perception cannot derive from one's beliefs, since one would have to believe at the same time that the object moves and stands still.

### *Impenetrability of vision*

For the past two decades philosophical research on non-conceptual content has coincided with the increased tendency of psychologists to differentiate between *sense* perception and *cognitive* perception—and the former is assumed to be concept-independent.80 Gary Hatfield in his book

75 A summary of this research is José Bermúdez and Arnon Cahen, Nonconceptual Mental Content, in: *The Stanford Encyclopedia of Philosophy* (Spring 2011 Edition), Edward N. Zalta (ed.), URL = <<http://plato.stanford.edu/archives/spr2011/entries/content-nonconceptual/>>. A more technical presentation of various argumentational approaches is in Athanassios Raftopoulos, *Cognition and Perception*, Cambridge, MA 2009, 131–353. The particular value of Raftopoulos' presentation is that he directly relates the discussions of non-conceptual content to the psychological research on impenetrability. For a collection of influential research papers on non-conceptual content see York Gunther (ed.), *Essays on Nonconceptual Content*, Cambridge, MA 2003. See also Bill Brewer, Perception Experience Has Conceptual Content, and Alex Byrne, Perception and Conceptual Content,

both, in: Matthias Steup and Ernest Sosa (eds.), *Contemporary Debates in Epistemology*, Malden, MA 2005, 217–230 and 231–250.

76 It does not help to say that we cannot know how animals think or perceive: in some situations scientists have managed to construct ways to get around this problem. For instance, it is possible to teach monkeys to choose the larger of two rectangles they have been shown. (See Fred Dretske, *Sensation and Perception*, in: Gunther [as note 75], 25–41, here 36.) Insofar as perception depends on available conceptual frameworks, it is reasonable to assume that monkeys would perceive these rectangles dependent on the concept »bigger than.« At the same time, it is very hard to teach monkeys »intermediate-size« relation – to teach them to choose, for instance, the medium-sized rectangle when shown three rectangles. However, since they

*Perception and Cognition* noted that the distinction between these two modes of vision is implicit in the way experimental psychologists articulate the aims of their experiments.<sup>81</sup> For instance, an experiment that tests the cognitive perception of shapes may try to establish how individual shapes are classified, while an investigation into the human perception of shapes will study people's capacities to discriminate shapes under various viewing conditions. Making such distinctions boils down to distinguishing sense perception from ordinary reasoning and conscious inference.<sup>82</sup> This led to the understanding of sense perception as »insulated« from conscious perceptual knowledge and an understanding that general knowledge cannot influence perception.<sup>83</sup>

It was through the groundbreaking research of the psychologist David Marr in the early 1980s that the separation of »early vision« from the cognitive aspects of visual perception became widely accepted among psychologists.<sup>84</sup> Research on early vision pertains to the sensory aspects of perceptual experience, such as shape, colour, size, distance etc. »Late vision«, understood as contrary to »early vision«, covers processes such as recognising, identifying, or classifying.<sup>85</sup> In 1999 the psychologist Zenon Pylyshyn published a highly influential article in which he claimed that early vision is *impenetrable* to conceptual thinking.<sup>86</sup> He compared human vision to a complex information processing system.<sup>87</sup> »Early vision« is a section of this system; it determines the spatial

three-dimensional layout of visible objects in the perceived scene. It enables us to grasp the spatial disposition of the things that we see, but it does not relate them to what we know or to what we remember. According to Pylyshyn, early vision is independent of any beliefs we may have and does not deal with identities or names of objects; it is part of the hardware of our capacity to see and a result of the evolution of human species.

One important argument in favour of Pylyshyn's thesis pertains to perceptual illusions. Psychologists in the past (and the proponents of New Look psychology especially) regarded optical illusions as important examples of the malleability of our perception. For them, optical illusions demonstrated the strong influence one's expectations have on visual experience. But Pylyshyn turned this argument in the opposite direction. He pointed out that we perceive an optical illusion *even when we know* that we are seeing an illusion. Consider, for instance, Fraser's spiral (fig. 1). It consists of concentric circles that are perceived as a spiral—and we perceive a spiral even when we know that we are dealing with an illusion and that we are looking at a set of concentric circles.

Pylyshyn also pointed out that neuroscience provides little evidence that the brain cells of the visual system receive information from the parts of the brain that deal with conceptual thinking.<sup>88</sup> It is possible to determine the parts of the brain that are active in the recognition of highly complex visual patterns, such as human faces. From

have been taught and grasped the relationship »bigger-than«, it follows that when shown three triangles of different size they must be able to see and conceptualise that the medium-sized triangle is bigger than the smallest one, and that it is smaller than the biggest. But since they cannot conceptualise the relationship »intermediate-size« – the argument will be that they can perceive relationships that they cannot conceptualise.

77 See Bermúdez, »Non-Conceptual Mental Content« for a summary of these arguments.

78 For this argument see Christopher Peacocke, Scenarios, Concepts, and Perception, in: Gunther (as note 75), 107–132, here 111.

79 Tim Crane, The Waterfall Illusion, in: Gunther (as note 75), 231–235.

80 For this distinction see Gary Hatfield, *Perception and*

*Cognition. Essays in the Philosophy of Psychology*, Oxford 2009, 5.

81 *Ibid.*, 54.

82 For a list of authors who make this distinction see Hatfield (as note 80), 11.

83 *Ibid.*, 11.

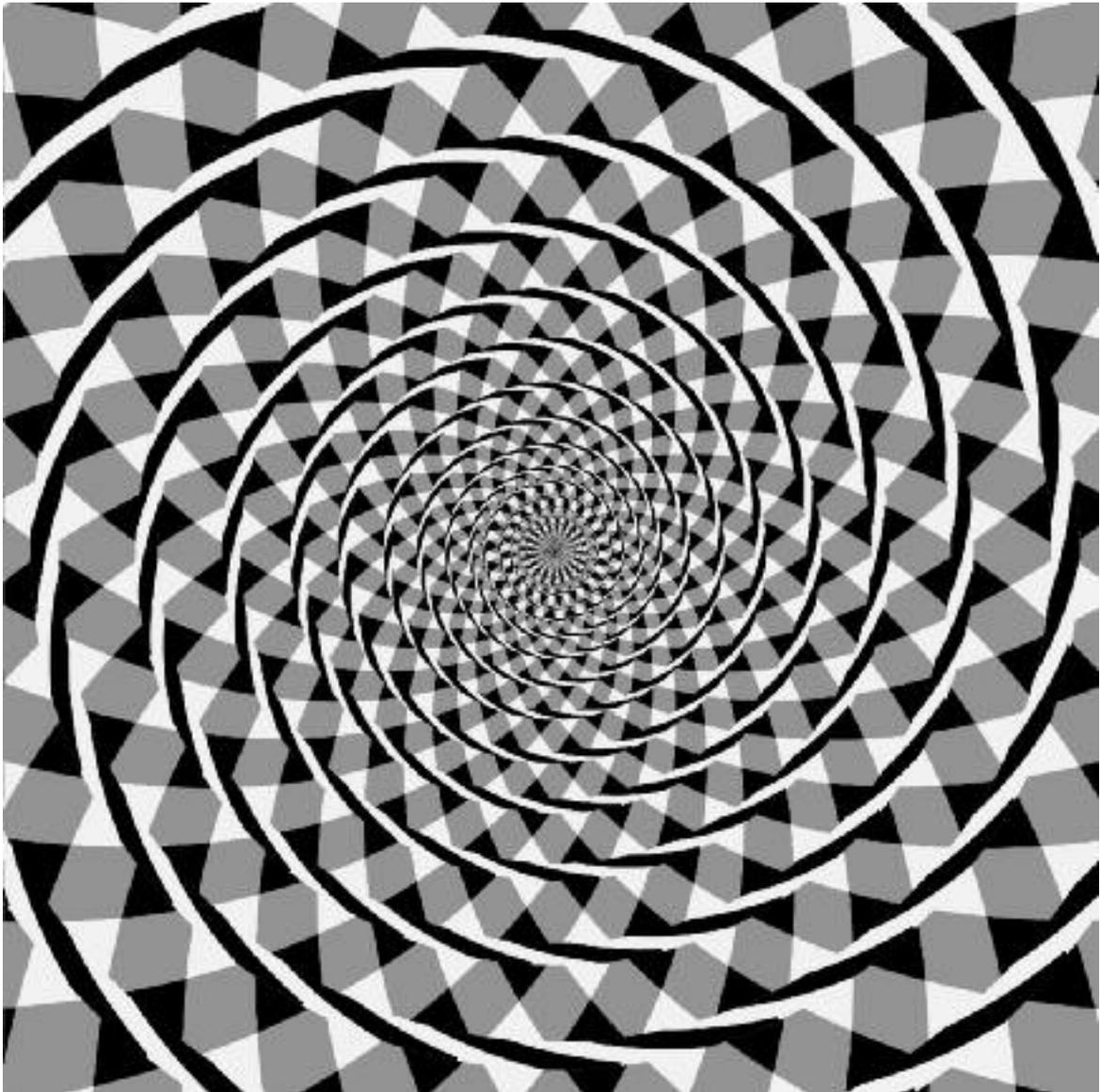
84 David Marr, *Vision. A Computational Investigation into the Human Representation and Processing of Visual Information*, San Francisco 1982.

85 Marr did not use the term »late vision«; the phrase is Hatfield's (as note 80), 54.

86 Zenon Pylyshyn, Is Vision Continuous with Cognition?, in: *Behavioral and Brain Sciences* 22, 1999, 341–365.

87 Pylyshyn (as note 37), 50.

88 *Ibid.*, 68–70.



1. Fraser spiral. One needs to trace »the spiral« using a pencil in order to see that it consists of circles

what is known, it seems that these cells do not receive information about the identity of the pattern (e.g. face) from other parts of the brain. For instance, our capacity to recognise a face in a certain social situation is not supported by our expectation that we will meet a certain person in that context. Further on, Pylyshyn drew attention to the fact that patients with some types of brain damage are able to perceive and grasp the spatial

properties of objects but cannot recognise what these objects are (*visual agnosia*).<sup>89</sup> Such patients for instance, can see their family members but cannot recognise them. This indicates that the section of the brain that deals with visual and spatial thinking is separate from the section of the brain that deals with conceptual thinking.

In Pylyshyn's view, New Look theories, together with the idea that »there is no innocent

eye« really belong to 1950s psychology and derive from the mid-twentieth century spirit of time and faith in biologically unlimited human potential.<sup>90</sup>

### *Aesthetics*

Literature on fine arts has been slow in adopting the results of research on non-conceptual content and the impenetrability of vision – certainly much slower than was the case with New Look psychology during the 1960s. Nevertheless, it is hard to imagine that positions in art history can be seriously sustained if their fundamental premises directly contradict the scientific understanding of human visuality.

Consider the case of aesthetics – a discipline with closer links to philosophy and thus prone to receiving intellectual influences from current trends in philosophy and psychology faster than art history. It was Kendall Walton's 1970 paper »Categories of Art« that introduced in English-speaking aesthetics the idea that human vision results from conceptual thinking.<sup>91</sup> Walton did not mention Gombrich, but the article relied on the assumption that one sees according to the conceptual categories that organise perception. The main target of Walton's criticism was the view that an artwork must stand on its own, independently of artist's views, social, historical or cultural circumstances. Rather, facts about the origins of artworks can have an essential role in art criticism. The argument Walton presented was based on differentiation between standard and variable features of artworks. A feature is standard if a work of art belongs to a certain category by virtue of having that feature; it is variable in the case that it has nothing to do with the work's belonging to a specific category. An object has to have certain properties in order to count as a painting, Chinese sculpture or a Byzantine mosaic. Since an object must have standard properties in order to belong

to a certain category, it may seem that such features are aesthetically irrelevant. All paintings have the features that are necessary for them to be paintings; consequently, these features will not help us when it comes to evaluating and ranging them aesthetically. But, Walton argues, this reasoning is wrong. The energy or brilliance of a fast section in a violin concert derives not from the absolute speed of the music but also from the fact that it is fast for that particular medium. Paintings in an unknown style or music from a radically different culture may appear as formless on the first contact, because one would not be perceiving them in relation to the specific context they originate from. Walton's conclusion, that subsequently exercised a huge influence on analytic aesthetics, was that aesthetic properties are always ascribed to a work of art in accordance with the features that are standard for such works of art. It is important to note that this conclusion relies on the assumption that there is no perception without classification: if artworks could be perceived independently of how we categorize them and if some sentiments (e.g. pleasure) could be derived from such non-conceptual acts of perception, then it is unclear why the attribution of some aesthetic properties (e.g. beauty) could not be independent of categorisation. Walton thus argued that if we excavated an artwork from the dust of an archaeological site on another planet, we would not be able to attribute to it any aesthetic properties since we would know nothing about the civilization that created it and would not be able to categorize it. But it is far from clear that this need be the case, and that we may not like its shapes or proportions independently of what we know or do not know about its origin.

The Walton-style position became increasingly hard to sustain in its strong form by the late 1990s. The British aesthetician Nick Zangwill opposed it by arguing for a position that he called *moderate formalism*—i.e. the view that *some aes-*

89 Ibid., 71.

90 For Pylyshyn's views on the history of the debate, see Pylyshyn (as note 86), 341–342 and Pylyshyn (as note 37), 49 and 83.

91 Kendall Walton, *Categories of Art*, cited according to Joseph Margolis, *Philosophy Looks at the Arts*, Philadelphia 1978, 88–114.

thetic properties depend exclusively on formal properties of objects, while others depend on our conceptual knowledge about the object.<sup>92</sup> It is plausible to construe Zangwill's »formal« properties as those that the human mind would process using early vision: shapes and the spatial layout of things. It would then follow that some aesthetic judgments can be based on non-cognitive visual processing. Compare this view with Walton's: Walton's position was credible in the 1970s because it went hand-in-hand with the stance that there is no perception without classification. In a context in which this position was generally accepted, it could hardly have been credible to suggest that aesthetic judgments can be independent of conceptual thinking. How could one make concept-independent aesthetic judgments if these judgments pertain to what one perceives and, at the same time, one cannot perceive without conceptualising?

If Zangwill were merely arguing that some aesthetic properties can be attributed independently of our conceptual knowledge and interaction with artworks, then his thesis about moderate formalism would be a mere plea for a wider perspective on aesthetic problems than the 1960s cultural-determinist understanding of human perception allowed us to formulate. But his important claim is that »beauty is the top dog« – and he clearly attributes greater significance to non-conceptual aesthetic properties.<sup>93</sup> Walton's position, one could say, was ultimately parochial: if all aesthetic properties are assessed on the basis of available concepts, and since the availability of certain concepts is limited to certain cultural contexts, it easily follows that aesthetic evaluation is always culturally delimited. Zangwill, however, is more cosmopolitan than Walton. True, he stops short of claiming that there are universally valid aesthetic judgments: after all, the ability to judge aesthetically may be similar to the ability to see colours

and some people are colour blind. However, he is saying that there are aesthetic judgments which no person will be incapable of making merely because he or she belongs to a specific culture.

The demise of the view that perception is conceptually predetermined cannot fail to affect the methodology of historical research on artworks. Consider, for instance, the question of what constitutes a credible explanation of an architect's decision to apply certain formal properties on a building. Quite in line with Gombrich's views, in his influential 1963 book *Intentions in Architecture*, Christian Norberg-Schulz argued that architecture cannot be interacted with at the level of pure form.<sup>94</sup> He claimed that one can only perceive forms as meaningful: that there can be no immediate experience of architectural works (for instance their masses or spaces) that is not mediated through concepts.<sup>95</sup> The implication is that when an architect made design decisions about the shapes, proportions or spaces of a building, this decision always had to be based on the meanings he or she attributed to these elements. Explaining an architect's design decision is consequently inseparable from stating the meanings that motivated it – an explanation that relies on the purely visual preferences of the architect is thus unsatisfactory, because there can be no purely visual perception on which such preferences would be based. However, as we have just seen, human perception is much more fine grained than our available conceptual frameworks; notoriously, this kind of methodology regularly suffered from the inability to find enough meanings (concepts) to account for the totality of spatial and visual decisions an architect typically has to make in his or her work. Following Zangwill, however, we can assume that some decisions were made on the basis of purely visual-aesthetic preference, independently of any conceptual consideration. Methodologically, the study of meanings, the

92 See Nick Zangwill, In Defence of Moderate Aesthetic Formalism, in: idem, *Metaphysics of Beauty*, Ithaca 2001, 82–101.

93 Nick Zangwill, The Beautiful, the Dainty and the Dumpy, in: Zangwill (as note 92), 9–23, here 23.

94 Christian Norberg-Schulz, *Intentions in Architecture*, Oslo 1963, according to the second edition 1966, 85.

95 Ibid, 85–94.

concepts associated with architectural (art-) works, becomes relevant only when it can be documented that they have indeed motivated the creative decisions of artists and architects.

### *Coda*

When it comes to art historical topics – such as the validity of perspective or the artistic implications of research on constancies – Gombrich's intuitions have been generally vindicated by subsequent psychological research. The ideas that have not stood

the test of time were those he imported from Popper, Gestalt- and New Look psychologists. Considering his faith in science and the wide range of his interests, it is hard to see how he could have avoided relying on them. For decades, this faith made him concentrate huge efforts on showing that the same scientific theories that provided so much ammunition for the rise of cultural relativism were also compatible with his universalist and humanist agenda. As it turns out, these scientific theories have in the meantime faded into history – while the agenda still remains relevant today.

Photo credit: 1 [http://commons.wikimedia.org/wiki/File:Fraser\\_spiral.svg](http://commons.wikimedia.org/wiki/File:Fraser_spiral.svg)

