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A Comparative Visual Analysis of Nineteenth-Century Iranian Portrait Photography and Persian Painting

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1. VISUAL LATERALITY: THE RELATIONSHIP BETWEEN THE DIRECTION OF WRITING AND COMPOSITION

If one observes the movements of a human being in possession of a camera (or of a camera in possession of a human being), the impression given is of someone lying in wait. This is the ancient act of stalking which goes back to the Paleolithic hunter in the tundra. Yet photographers are not pursuing their game in the open savanna but in the jungle of cultural objects, and their tracks can be traced through this artificial forest. The acts of resistance on the part of culture, the cultural conditioning of things, can be seen in the act of photography, and this can, in theory, be read off from photographs themselves.

Vilém Flusser¹⁶

“If right and left had not been relegated to the traffic regulations or to the terrestrial and celestial ceremonial, Science and Philosophy would have known how to use them fittingly.”
Silvio Ceccato¹⁷

The main research question of this chapter is whether, and if so, how the direction of writing and reading of Iranian nineteenth-century photographers influenced the composition of the studio photographs of this period. To understand the relation between the two, I have defined groups of photographs to show different ways of composition due to the different reading habits (left-to-right on the one hand, right-to-left on the other). This research is built on visual analysis and from two frames of reference: art history and neuroscience. First, I will define the phenomenon of visual laterality, then I will introduce the photographic corpus identified as showing the effect of the phenomenon of visual laterality. I will finish the chapter with an historical survey of the main conclusions and results found both in the fields of art history and neuroscience that support the main hypothesis of this chapter. It is important to note that the art historical literature that relates to this phenomenon belongs mainly to the first half of the twentieth-century whereas the literature in the field of neuroscience is recent, mostly produced in the last fifteen years. This apparent gap in the art history literature can be explained by the fact that in the field of neuroscience an important group of scholars focused their research on answering and giving an appropriate theoretical framework to the questions posed by some art historians several decades ago, though in a very discrete way. The most recent literature in this field has an interdisciplinary approach.

¹⁶ Flusser 2000, p. 33.

¹⁷ Taken from Fritsch 1964, p. 7. Silvio Ceccato (1914-1997) was an Italian philosopher and linguist.

1.1. Definition of visual laterality

Scripts can be written in many directions. The Japanese scripts specialist Akira Nakanishi has elaborated nine models (fig. 1a) to resume the different directions of scripts.



Figure 1a

Ancient Phoenician and Aramaic scripts were written in (a) only; the descendants of these scripts, Arabic, Hebrew, Farsi, Urdu, and others, are now written in the same way, i.e., from right to left, the opposite direction of all Western languages (b). The neurologist Chris McManus has made a schema of the evolution of the direction of the script in the different languages (fig. 1b), which is very helpful to understand the remarkable number of languages written today with a right-to-left (leftwards) script.¹⁸ Would this remarkable difference in the writing direction used by different cultures affect in some way the composition in works of art, and in particular in the photographic image, since the direction of writing and reading is exactly the opposite in these two groups of languages? The area of research of this study is Iran in the nineteenth-century and the material of study is photography. The language in question is Farsi. My conclusions will be directly connected to photography. Is there a difference in composition between the photographs made by Westerners and by Iranians resulting from this? In other words, I want to know if photographs show evidence of *visual laterality*, and visual laterality is defined here as the conditioning of the composition of the image by the direction of writing.

¹⁸ After McManus 2004, pp. 242-43.

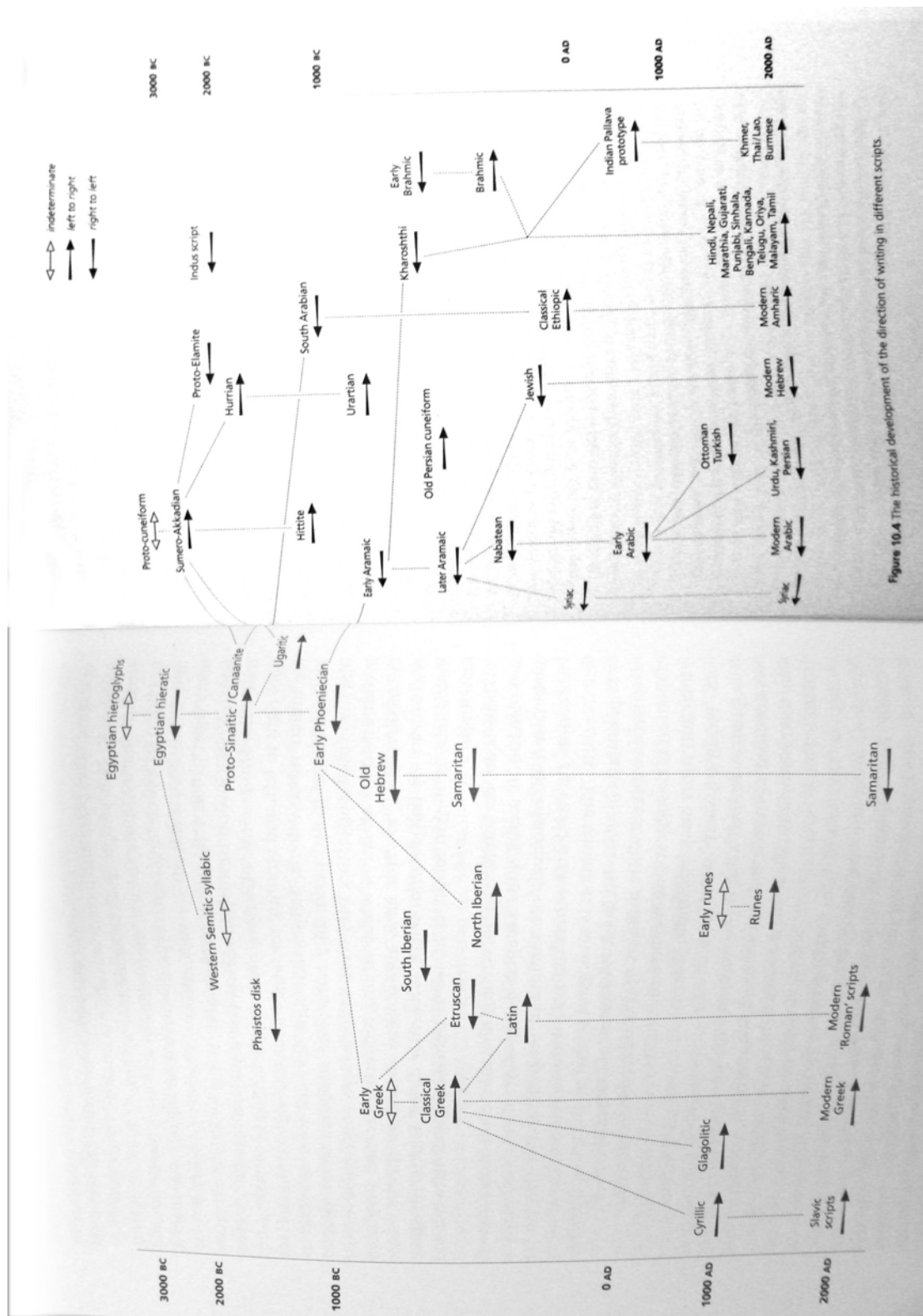


Figure 10.4 The historical development of the direction of writing in different scripts.

Figure 1b

How does visual laterality manifest itself, if at all? One of the topics that are fundamental to understanding visual laterality is to know and define its relation with laterality caused by handedness¹⁹ and hemisphere specialization, in other words, if there is a relationship between left and right in pictorial and photographic space and left and right in the brain. In this particular case, the condition of the composition of the photographic image. My hypothesis is that the fact that Farsi is written from right to left implies a production of mirror images to those produced by Western photographers. For the purposes of this discussion a mirror image is understood to be a reflection with respect to the human's plane of symmetry, that is, a left-right mirror image.

Asymmetries of the pictorial space could arise from asymmetries of the brain or from cultural conventions. The psychologists Charles G. Gross and Marc H. Bornstein suggest that both contribute to the anisotropy²⁰ of art but in different ways.²¹ I will start this research with the second cause of anisotropy of the photographic space, the cultural convention due to the direction of writing of different scripts. Aestheticians have frequently asserted that left and right in a picture are absolutes. The Swiss art historian Heinrich Wölfflin (1864-1945) called attention to the fact that pictures change appearance and loose meaning when turned into their mirror images. He realized that this happens because pictures are "read" from the left to the right, and naturally the sequence changes when the picture is inverted.²² Wölfflin noted that the direction of the diagonal that runs from bottom left to top right is seen as ascending, the other as descending. Any pictorial object looks heavier at its right side.²³ Therefore, my hypothesis is that, if the only condition for that rule of composition is that the pictures are "read" from left to right (like the direction of writing of all Western languages), then the opposite applies to the rest of the languages, i.e. those written from right to left (like Farsi): Iranian photographers produce mirror like images to those made by Western photographers. We can see Wölfflin's thoughts summarized in figure 2a, where the final point of the scanning path in red (bottom right) is the heaviest point of the image (painting or photograph). Thus, Western artists would avoid placing an object there and would place it in the bottom left where it does not have such weight as in the symmetrical point. In figure 2b you can see the Persian (Arabic, Urdu, etc.) version where the final point of the path (bottom left) is the one to be avoided by Iranian artists. We can clearly see that both figures are mirror-reversed images of each other.

¹⁹ Handedness is an attribute of human beings defined by their unequal distribution of fine motor skill between the left and right hands. An individual who is more dexterous with the right hand is called right-handed, and one who is more skilled with the left is said to be left-handed (8-15%).

²⁰ Anisotropy is the property of being directionally dependent as opposed to isotropy, which means homogeneity in all directions.

²¹ Gross and Bornstein 1978, pp. 29-38.

²² Wölfflin 1941, pp. 82-96.

²³ Further reading of works by other aestheticians about the right-left problem in art: J.W. Schlosser, "Intorno alla lettura dei Quaddri", *Critica*, XXVIII, 1930, p. 72; Anton Faistauer, "Links und Rechts in Bilde", *Amicis, Jahrbuch des Oesterr. Galerien*, 1926; R. Keller, "The Right-Left Problem in Art", *Ciba Symposia*, Summit, N.J. III, 1942, p. 1139.

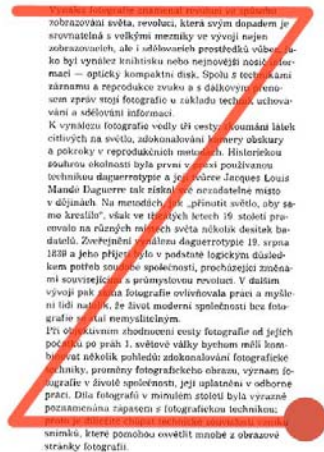


Figure 2a



Figure 2b

The art historian Mercedes Gaffron carried Wölfflin's investigation further. According to her, the observer experiences a picture as if he was facing its left side. He is subjectively identified with the left, and whatever appears in that part of the picture assumes the greatest importance.²⁴ This agrees with the art historian Alexander Dean's observation of the so-called stage areas of the theatre. He states that as a curtain rises at the beginning of an act, the audience can be seen to look to its left first. The left side of the stage is considered the strong one. In a group of two or three actors, the ones on the left dominate the scene.²⁵ In Chinese theatre, on the other hand, the important positions are to the audience's right. It is interesting to know whether this can be extrapolated to photographs.

As stated by the art historian Rudolf Arnheim, it will be evident that when the observer experiences facing the left side, a second and asymmetrically located centre is created in the picture at that side. Just like the center of the frame, this subjective center carries importance and can be expected to influence the composition accordingly. A contrapuntal relationship between the two centers results.²⁶ Like the area around the center of the frame, the area of the subjective center is able to carry more weight. There is, then, a curious difference between being "important" and central, at the left, and being heavy and conspicuous at the right, in the words of Arnheim. The same could have been said by an Iranian researcher writing about composition in Iran. Only he would say that a curious difference between being "important" and central, at the right, and being heavy and conspicuous, at the left. Concluding these observations on the right-left phenomenon Wölfflin reminds his readers that he has described, but not explained it, and he adds: "Apparently it has deep roots, roots that reach down to the nethermost foundations of our sensuous nature".²⁷ At present the most common explanation runs along empiricist lines. The reading of pictures from left to right is a habit taken over from reading the books.²⁸

As stated by Gaffron, the art historian Theodora Haak describes a European tendency of compositions where the movement enters the picture from the left, and where the left side shows more clarity and distinction, while the right leaves more

²⁴ Gaffron 1950, pp. 312-313.

²⁵ Dean 1946.

²⁶ Arnheim 1974.

²⁷ Wölfflin 1941, p. 90.

²⁸ Arnheim 1974, p. 50.

room for the play of imagination. She explains this tendency by a preponderance of right-eyedness. However, in a later work, considering the opposed direction of movement in East Asiatic art, she abandons this theory and assumes that a fundamental difference in mental structure must be the cause of the directional contrast in Western and Eastern art.²⁹ In contrast to European pictures, Theodora Haak found out that in the pictorial representations of Eastern Asia one finds a marked direction of movement from right to left. It manifests itself with particular distinctiveness in the so-called *makimono*, in the long scroll, which must be observed while being unrolled uninterruptedly from right to left on the floor.³⁰

There is some empirical evidence to support what some art critics have said about a picture that loses something of value when mirror reversed. As stated by the scholar Martin Gardner in his interesting book *The New Ambidextrous Universe. Symmetry and Asymmetry from Mirror Reflections to Superstrings*, David B. Eisendrath Jr, a New York photographer (he does not mention when), prepared a set of 50 scenic photographs so that each picture had two reproductions, one a mirror image of the other. The pairs were shown one at a time to various viewers who were asked to designate which one of each pair they liked best. Scenes that had an overall left-right symmetry were chosen as often in one form or the other, but if the scene showed a composition with strong asymmetry, there was about 75 percent agreement among subjects on the choice of one picture over its mirror twin. All these viewers read from left to right. When the same pictures were shown to viewers who read only Hebrew, which goes from right to left, there was a tendency to prefer the mirror reversals of those pictures that had been preferred by left-to-right readers.³¹ Further, Gross and Bornstein ask themselves, if, as aestheticians say, mirror reversal changes the meaning of a painting, why have so many artists, from Raphael and Rembrandt to Munch, remained apparently indifferent to the reversal of their originals when reproduced as prints or tapestries? And why, conversely, did a few, such as Dürer and Van Gogh, take great care to etch originals in their mirror image?³² They point out that, in fact, objective studies (meaning here, based on statistics) involving a number of observers and different paintings have lent little support to the generality of the claims of art historians, that mirror-reversing paintings consistently change the content or tone of the original. A possible explanation for the failure of experimental psychologists to find the perceptual differences between paintings and their mirror images claimed by aestheticians might be, as Gross and Bornstein suggest, that the psychological experiments involved collections of both symmetrically and asymmetrically organized compositions. In contrast, aestheticians exemplify their point with highly asymmetrical paintings, with marked perspective and lighting differences between the two sides that clearly do alter on reversal.

In sum, the visual laterality hypothesis is supported by the ideas of classic art historians and aestheticians such as Arnheim and Wölfflin. Their theories have not been contradicted since then and their ideas are still valid in the field of art history and provide an appropriate theoretical background for my research.

²⁹ Gaffron 1950, p. 315.

³⁰ Keller 1942, p. 1142.

³¹ Gardner 2005, pp. 36-37.

³² Gross & Bornstein 1978, p. 34.

1.2. Nineteenth- century Iranian portrait photography

I have organized the photographs in three different groups attending to the type of composition that they have: the first group, *linear order*, consists of images in which a group of sitters have been depicted arranged by their height; the second group, *couples*, consists of images in which a couple has been depicted, one sitter sitting and the other standing; and the third group, *chairs*, in which a sitter is depicted standing and resting one of her/his hands on the chair.

Linear order

The first group of studio portraits of groups is where people depicted are organized by their height. This group was established after finding a group photograph that depicts five Iranian children (fig. 3), the image responsible of the whole classification that will be shown here. If we compare figures 3, 4, 5, 6 and 7 made by Iranian photographers and figures 8, 9, 10, 11 and 12 made by Western photographers, we can clearly see that some are mirror images of the others. The first photograph (fig. 3), made by an anonymous Iranian photographer, shows a group of Bakhtiari³³ children, most probably brothers, who posed in height order, from smallest to tallest, if we read it in the Iranian way, but from tallest to smallest if we read it in the Western way. From the clothing the children are wearing, I can conclude that they were court children. The names have been identified as (right-to-left) Afrasiab, Bahman, Shatar, Seifollah and Sohrab.³⁴ Another photograph (fig. 4), made by Iranian photographer Reza Akkasbashi, shows Prince Firouz Mirza's children, from right to left: the infant Prince Abdolhossein (Farman Farma), Princess Mahsumeh (Esmat os-Saltaneh), Princess Soroush os-Saltaneh (Hazrat-e Olia) and Princess Malek-Taj (Najm os-Saltaneh). The photograph was taken around 1860. Taken by Reza Akkasbashi, the next image (fig. 5) presents the sons of Mohandes-e Mamalek in Tehran, ordered again by height, standing on a Persian carpet and performing a military salute. These three images are the clearest photos showing the difference in composition on the basis of visual laterality. The next photograph of this group (fig. 6) was taken as well by Reza Akkasbashi in 1866 shows also this tendency. It depicts two men sitting (Ismail and Asad al-Khan if we start with the one at the right of the image) and one standing at the left side of the photograph (Naser a-Manushi). The last one (fig. 7) can be seen also as two groups of people organized by height: the first one on the back row is formed by four men and one boy; the second one on the front row is composed by four children also organized by height. Its author is an unknown Iranian photographer.

As I have mentioned before, direction in composition is one of the two factors that determine balance, weight being the other one. This first group of pictures is particularly interesting as far as the direction of the image is concerned, but it also shows clearly what Wölfflin said about the ascending-descending diagonal. He said that the direction of the diagonal that runs from bottom left to top right is seen as ascending, the other one as descending, which is what is happening in the Western

³³ The Bakhtiari are a group of southwestern Iranians. A small percentage of Bakhtiari are still nomadic pastoralists. They inhabit the provinces of Lorestan, Khuzestan, Chahar Mahal and Bakhtiari, and Isfahan.

³⁴ Taken from *Qajar Studies. Journal of the International Qajar Studies association*, Vol. VIII, 2008, p.127.

photographs that we present here and exactly the opposite (opposite meaning here “mirror-like” compositions) to what happens in Iranian photographs.

The first photograph of this group of Western photographs (fig. 8), taken by the Czech photographer Ignác Schächtl in 1890 in Tábor (Czech Republic), presents a group of children that are organized by height like the ones shown before, but in this case the order mirrors the first ones. The same is true for a family portrait (fig. 9), taken by Czech photographer Josef Jindrich Sechtl in 1911 in Bozejov (Czech Republic) and which presents the Novak Family. The composition of these two images is mirror-reversed of figures 3, 4 and 5. The same happens with a photograph of a group of Khiva women with their children (fig. 10), taken by the French photographer M. Hordet not later than 1890. Even today we can find examples of this kind in contemporary photography of photographers that are educated in a right-to-left script. *Converging Territories # 10* (fig. 11), taken by the Moroccan photographer Lalla Essaydi is a contemporary example of this. Essaydi places Islamic women in an isolated space and literally decorates them with text written with henna. The next photograph (fig. 12), a daguerreotype made by the French photographer E. Lorichon around 1850 in Spain and another daguerreotype of a family (fig. 13) taken by the British photographer Frank and Wiple around 1850 are very similar and they show the Western one-dimensional order that I have referred to. These two images are mirror-like images of figure 6.

Couples

The second group, the *couples*, is actually a smaller version of the first group. In this kind of photographs, a couple is depicted and one person is always sitting, the other one standing up. We can compare figures 14, 15, 16 and 17 made by Iranian photographers with figures 18, 19, 20 and 21 made by Westerner photographers. The Western photographs are mirror-like images of the Iranian ones. The one who is sitting is usually the person of highest social rank (figs. 16, 20), the older one (figure 21) or in the case of children, the smallest child (figs. 14, 18). Also, if the couple is mixed, then usually the woman is sitting. In the photographs made by Iranian photographers, the chair is, in the majority of the cases, placed at the bottom right side of the picture, i.e., avoiding the heaviest weight point, under Iranian composition (see figure 2b). However, in the photographs taken by Western photographers, the chair is almost always placed at the bottom left side of the picture, avoiding the heaviest weight point (in a Western composition). As a curiosity, I found one portrait that deserves a more detailed observation since the two men depicted are actually one and the same person (fig. 15); the photograph is an interesting double exposure picture of one of the sons of Baha al-Molk taken by Agha Reza Eqbal al-Saltane.³⁵ In this case hierarchy plays no role.

There is another difference between Western and Iranian studio portrait photography in the way couples or groups of people are composed and arranged. In Western photography we can find many examples of studio portrait photographs of couples formed by a man and a woman. As photography historian William C. Darrah states, among the more abundant surviving *carte de visite* portraits are those of newly married couples and husband and wife at various ages. The most striking convention

³⁵ Doble exposure in nineteenth-century was specially related and used in spirit photography, but there were photographers that were using it just to create funny tricky portraits or scenes, like the one shown here. A very interesting book about this topic is: Henisch & Henisch, *The Photographic Experience 1839-1914: Images and Attitudes*, Pensilvania University Press, 1994.

is the almost universally used pose of the husband seated and the wife standing, with one hand on her husband's shoulder.³⁶ In contrast to this, only rarely do you find studio portrait photographs of couples composed of man and wife in Iranian photography in the nineteenth century. There are portraits of a man with several wives (the most famous case being Naser od-Din Shah), normally the man standing and his wives on a lower level, sitting or kneeling. However, as stated by Iranian historian Guity Nashat, with the exception of rulers and wealthy individuals, most marriages were monogamous. Polygamous marriages around the well-to-do were rare but were not unheard of: men took second wives when their first wives reached menopause. However, the prospect of sharing a husband with another woman was a threat hanging over the heads of many wives.³⁷ What we can find prolifically is portraits of two men, normally one sitting depending as a sign of respectfulness (the older one normally is sitting) or hierarchical reasons (normally the socially highest rank is sitting).

In this group of couples, we can also identify a subgroup of mothers and fathers holding a child on their lap. It has been already demonstrated by groups of neurologists³⁸ that in most of the photographs of parents holding children on their lap, the babies or children are sitting on the left part of their parent's bodies. This bias direction is well established, but why it is to the left, remains unclear. Among several explanations proposed, the handedness explanation posits that most people, being right-handed, hold the child on the left side to keep their right dominant hand free for other tasks related to infant care.³⁹ The heartbeat explanation posits that the heartbeat, being more detectible on the holder's left side, makes the left hold more soothing for the infant.⁴⁰ The attention explanation credits the bias to the selective activation in the holder of right-hemisphere-lateralised perceptual, emotional and intentional systems, which predispose a left hold by directing the holder's attention to the left.⁴¹ Nevertheless, even if this basic directional effect is well established, many details are still uncorroborated, uncertain or inconsistent across studies, and further research is needed.

I have collected some of these photographs, both nineteenth-century Iranian and Western, and I have analyzed them from a formal point of view. The compositions of those photographs agree with the results presented by the neurologists only when we consider Western photographs. Most of the Iranian photographs (figs. 22 and 23) have reversed compositions (mirror-like compositions) compared to the Western ones (figs. 24 and 25). This, again, raises the question of whether the directionality of the script may play a role in this kind of composition. After having analyzed the material presented above, I can only conclude that there is a tendency of mirror reversal composition on Iranian photographs that depict couples of mother/father and child.

Chairs

The third group, *chairs*, is a clear example of Wölfflin's hypothesis. The group of photographs that I present here (figs. 26, 27, 28 and 29, taken by Iranian

³⁶ Darrah 1981, p. 36.

³⁷ Nashat 2004, p. 76.

³⁸ Harris et al. 2007, pp. 64-86.

³⁹ See: Van der Meer and Husby 2006, pp. 263-276.

⁴⁰ See: Salk 1961, pp. 740-746. See also: Todd and Butterworth 1998, pp. 229-233.

⁴¹ See: Harris et al. 2006; Vauclair and Donnot 2005, pp. 564-571.

photographers) and 30, 31, 32 and 33 (taken by Western photographers) are just a few of many examples of it. The first photograph of this group (fig. 26) is a very interesting picture as far as the viewpoint of the photograph is concerned. The photographer has lowered his plane in order to fit the child fully within the picture's frame and therefore, the chair has got a very dominant role, almost a majestic one. The child is posing with a lot of charm and in a very natural way. The next photograph (fig. 27) depicts Sultan Ahmad Shah Qajar in a very self-conscious pose for a young boy. He is wearing the clothes and regalia typical of court children and he even holds the omnipresent sword of Qajar painting portraiture. Naser od-Din Shah is looking extremely self-conscious and elegant (fig. 28), resting his left hand on the most photographed court chair, that highly carved rococo one in which all his wives were immortalized by himself. This photograph was taken by his favourite court photographer, Reza Akkasbashi. The last image of this group of Iranian photographs (fig. 29) is the one that depicts Hajji Ali Khan E'temad al-Saltaneh (Minister of Security Affairs and Governor of Golpayegan and Khansar). In the Western group of pictures (figs. 30-33) we can see three women; the last one is a portrait of two Iranian men and was taken by the Georgian photographer Antoin Sevruguin (late 1830s-1933). In all these Western images, we can notice that the object located on the right side (in this case, the chair) seems to be heavier than the one located at the left side (as Arnheim points out). Is this visual laterality caused only by the choices made by the photographer, or can it also be produced by the person or group of people depicted? The homogeneity in the pose of those depicted in nineteenth-century portraits points to the fact that, most probably, the photographer was the one who arranged the scene in an already established way and the sitter would just follow the directions of the photographer.

The three forms of composition that I have defined above, agree with the examples of stimuli used in the aesthetic preference experiment already proposed and used by the neurologists S. Christman and K. Pinger and later on by Health et al., which consisted of three geometric elements arranged laterally to form a composition: a vertically-oriented solid black rectangle to represent Weight, an outline of a elongated triangle to represent direction and a stippled hat-like shape to represent Interest (fig. 34).⁴²

⁴² Taken from Christman and Pinger 1997, p. 159.

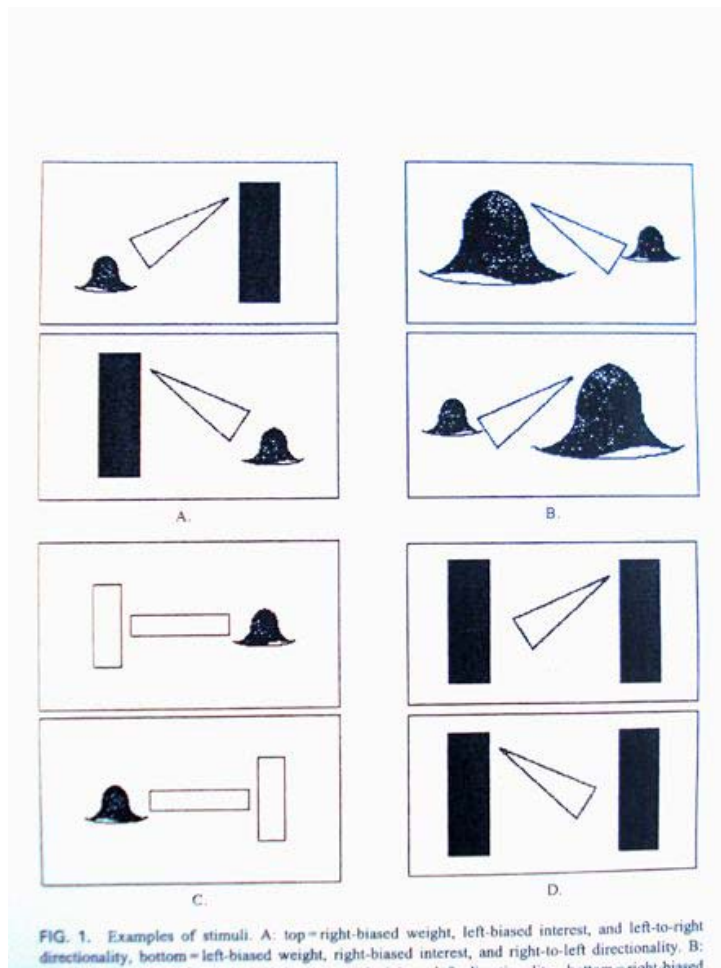


Figure 34

Examples of stimuli. A: top=right-biased weight, left-biased interest, and left-to-right directionality, bottom=left-biased weight, right-biased interest, and right-to-left directionality. B: top=left-biased weight, balanced interest, and right-to-left directionality, bottom=right-biased weight, balanced interest, and left-to-right directionality. C: top=absent weight, right-biased interest, and absent directionality, bottom=absent weight, left-biased interest, and absent directionality. D: top=balanced weight, absent interest, and left-to-right directionality, bottom=balanced weight, absent interest, and right-to-left directionality.

The three basic compositions I have described at the beginning of this section can be identified with some of the examples of stimuli presented by Christman and Pinger. They can be identified as one of the examples of stimuli shown above:

- * linear order and couples, Iranian composition: figures 3, 4, 5, 6, 14,15,16 and 17 are examples of stimuli “D” bottom (balanced weight, absent interest, and right-to-left directionality).
- * linear order and couples, Western composition: figures 8, 9, 10, 11, 18, 19, 20 and 21 are examples of stimuli “D” top (balanced weight, absent interest, and left-to-right directionality).
- * mother/father and child on her/his lap, Iranian composition: figures 22 and 23 are examples of stimuli “D” bottom (balanced weight, absent interest, and left-to-right directionality).

- * mother/father and child on her/his lap, Western composition: figures 24 and 25 are examples of stimuli “D” top (balanced weight, absent interest, and right-to-left directionality).
- * chairs, Iranian composition: figures 26, 27, 28 and 29 are examples of stimuli “A” top (right-biased weight, left-biased interest, and left-to-right directionality).
- * chairs, Western composition: figures 39, 31, 32 and 33 are examples of stimuli “A” bottom (left-biased weight, right-biased interest, and right-to-left directionality).

Arnheim wrote: “An unbalanced composition looks accidental, transitory, and therefore invalid”.⁴³ This however depends on whose eyes are looking at that particular artwork. He also wrote that looking at those unbalanced compositions, we get the impression that the process of creation has been suddenly and accidentally frozen somewhere in its course. Since change is needed, the stillness of the work becomes a handicap.⁴⁴ Foreign observers of nineteenth-century Iranian photographs, such as the ones presented above, could wrongly perceive them as not well composed, but this is a judgment based on ignorance of the existence of other modes of representation. Actually that is what happened in India. As the art critic and photo-historian Judith Mara Gutman pointed out, in the West the great majority often laughed at photographs like these (non-perspective photos), thinking of them as “mistakes”.⁴⁵ In 1895, a correspondent for the *Practical Photographer*, a magazine published in London for the large audiences soaking up information about photography, caught a glimpse of the swell of indigenous photographic activity in India. He found it repulsive, citing the bazaars that were “infested” with native photographers who were bringing down the level of photography all over India.⁴⁶

There are, however, exceptions in both cases, in the Western a small percentage, and in the Iranian a larger one. The larger number of exceptions in Iran has, I believe, a logical explanation: the Iranian mirror-like images are decreasing with time due to European influences. That means, and this is a new hypothesis, that visual laterality changes around the end of the nineteenth-century and the beginning of twentieth-century.

Movement and visual laterality

Up to this point I have only analysed studio portrait photographs that are static. Now I will consider those that also suggest movement. I want to consider this aspect because it also gives support to my hypothesis, both with clear graphic examples and theory from the field of neurology. As the psychologist Jerre Levy points out, it may be that those pictures in which movement, implied or potential movement is present, are preferred by Western observers when the movement is from left to right. If so, monolingual readers of Hebrew and Arabic would prefer the opposite versions of such pictures from those preferred by readers of European languages.⁴⁷ Levy carried out an experiment with Western observers to see their preferences for 97 vacation slides or their mirror versions. He found that left and right-handers differ in their preferences for mirror versions. In 1976 he planned to carry out a replication of this

⁴³ Arnheim 1969.

⁴⁴ Arnheim 1969, p. 12.

⁴⁵ Gutman 1982, p. 39.

⁴⁶ Gutman 1982, p. 23.

⁴⁷ Levy 1976, pp. 431-445.

study, using the same sets of slides, in Israel, but I do not know if the experiment has been made or not. Serious experiments similar to this have been undertaken by different groups of neurologists around the globe and I will devote some time to them and their results in the section concerned with the neurological approach to the right-left problem.

The next three images taken by unknown Iranian photographers, present a potential movement towards the left, like the direction of writing of the Iranian script. The first image of this group (fig. 35) depicts a man riding a horse and crossing a river. The horse is going from right to left and his position on the bottom left corner stresses the fact that he is moving leftwards. The movement in the river brings to the viewer the feeling that the horse is really going through difficulties crossing the river. The next image (fig. 36) is one of the most beautiful images that I have seen in nineteenth-century Iranian photography. Five small children are depicted sitting on a bench with a leftward reclining pose. The last image of this group (fig. 37) depicts a man riding a motorbike in the right-to-left direction. To support my hypothesis, I have identified many stone reliefs and paintings of earlier times in Iran. Is there a tendency to show the movement on the right-to-left direction, like the direction of reading and writing in Iran? Further below, I will present some of those paintings and stone reliefs.

Wölfflin remarked: "one could mean that our art - in the sense of our writing - must always have the inclination, to present movement from the left to the right (marching soldiers, running horses). It is certain that the right side of the picture has a different value from the left one. It decides the general tendency of the picture, that is, its movement to the right".⁴⁸ A good example of this is the motion studies of horses by the photographer Eadweard Muybridge (1830-1904). Further, Arnheim points out that "since the image is read from left to right, the pictorial movement towards the right is perceived as easier, as if it demanded less effort. If, on the contrary, we see a rider crossing the image from right to left, it will seem to be overcoming a greater resistance, using a greater effort, and therefore going more slowly".⁴⁹ These phenomenon can be related (observable when visual representations are compared with their specular images) with the findings of psychologist H. C. Van der Meer in the sense that "spontaneous movements of the head are executed more quickly from left to right than in the opposite direction" and that, when experimental subjects are requested to compare the speeds of two locomotions, one from left to right and the other from right to left, they perceive the movement towards the left as faster. It is possible to conjecture that the movement towards the left appears as the winner of a greater resistance; it pushes against the current instead of letting itself be taken by it.⁵⁰

Since Farsi is read and written from right to left, the movement of an image, a scene, will be also depicted and read in that direction. After examining and going through a vast number of Iranian paintings and stone reliefs, I can conclude that this is true most of the time. In the majority of cases, in the Iranian paintings and rock reliefs, the horse is running in the right to left direction, whereas in the Western paintings and reliefs the horse would be running in the left to right direction.

There are many examples of this kind to be found in painting, but I will show here just a few examples of these kinds of works in Iranian art. In *Fath `Ali Shah Received by Mirza Riza Quli Munshi al-Mulk in Sawdasht* (fig. 38), the story is happening in the right to left direction. The important figure in the picture is on the

⁴⁸ Quote translated from Wölfflin 1941, p. 83.

⁴⁹ Arnheim 1974, p. 43.

⁵⁰ Van der Meer 1958.

left, Fath `Ali Shah enthroned on the Sun Throne, is receiving gifts from a vizier, and other men are also waiting to give him some presents. The arrow of reading is clearly in the right-to-left direction. This painting belongs to the manuscript of the *Shahanshahnameh* (Book of the King of the Kings) that was donated in 1818 to the Österreichische National Bibliothek.

The *Pictorial Cycle of Eight Poetic Subjects* is painted by an unknown artist in Shiraz in mid eighteenth century; here I have selected four of the eight works that constitute this cycle (fig. 39) These eight lyrical paintings constitute, collectively, a valuable document of the original architectural format and narrative program of eighteenth-century domestic interiors: these oil-on-canvas paintings were cut to fit small niches located in the upper walls of the reception room of a residence or a pleasure or hunting pavilion. The paintings depict beloved stories from the classic works of classic Iranian poets such as Nizami and Jami and often also hunting scenes were depicted. In these four images, four different stories are depicted: *Queen Shirin Visiting the Sculptor Farhad* (by Nizami); *Khusraw Discovers Shirin Bathing* (by Nizami); *Bahram Gur and Azadeh* and *Hunter on Horseback Attacked by a Lion*.⁵¹ *Shirin Presents a Jug of Milk to Farhad* (fig. 40) was painted by an unknown artist in Iran in the late 15th –early 16th century. This work is one of the number of episodes from Nizami’s text concerning painting and sculpture. Nizami’s text, written in the fourteenth century, and the subsequent popularity of this theme illustrate the slow upsurge in the acceptance of the art of painting in Iran. Here we see that the scene is happening again in the right-to-left direction, like the direction of reading and writing of the Iranian painter that made this work. Again, the horse is running towards the left side of the picture. *Military Review with Fath `Ali Shah and Prince Husayn `Ali Mirza* (fig. 41), painted by an unknown artist in Shiraz is an interesting example of the right-to-left directionality of the happening of the scene of a ritual encounter of Fath `Ali Shah and a prince during a military review. The prince has fallen to his knees before the Shah and is identified by an inscription above his head with his title, Farmanfarma (Prince Husayn `Ali Mirza, Fath `Ali Shah’s son who was governor of Shiraz in 1799-1835). Husayn `Ali Mirza’s three sons appear at the upper left, with their names (Akbar Mirza, Shahrukh Mirza and Timur Mirza) inscribed above their heads. The Shah is mounted on horseback at the center of the picture, dominating the composition and all those around him and the scene is clearly happening in the right-to-left direction. In *Fath `Ali Shah at the Hunt* (fig. 42), we can see again the horse running from the right to the left. This stone relief executed by `Abdallah Khan in Rayy, circa 1820-30. Next to the main scene, there are other more peripheral scenes that also reveal this leftward directionality (see, for instance, the one happening in the right top corner). These are just but a few examples of this phenomenon, and anybody who may open a book about Persian miniature, will be able to gather many examples of the kind that I have just shown. I have also researched for sometime miniatures that illustrate Urdu (also right-to-left script) literary texts and I have found the same consistent leftward directionality in the way the scene is happening and on the direction of the depicted horses.

⁵¹ As stated by the Iranian Islamic art historian Diba in 2001, even though the themes of these works are derived from manuscript painting, their treatment differs considerably: the scale of the figures in relation to the background is larger, while the number of figures and degree of ornamental patterning is reduced. The palette is restricted to red, blue, cream and brownish green hues, and unmodulated, broad pasajes of color predominate.

We can easily find contemporary examples of this directionality in Iranian comics, in Iranian websites (specially interesting to see is the mirror-like composition of the design of the websites that have an Iranian section and an English one) and also in Iranian films where the movement of the camera reveals the influence of reading habits on composition and directionality in Iranian cinema. This also supports the visual laterality hypothesis but it is a new field of research that is beyond the scope of the present dissertation but that deserves further and deep research.

In sum, I can conclude that there is a tendency in nineteenth-century Iranian photographers to produce mirror-like images of those produced by their Western colleagues. This tendency has been proven to be consistent in the three groups of composition that I have analyzed through the chapter: in the group *linear order*, Iranian photographers tend to organize the group of sitters by height, from the shortest to the tallest in the leftward direction, whereas the Western photographers tend to organize the group in the opposite direction; in the group *couples*, the person that is sitting on the chair in Iranian photographs is normally placed on the right side of the photograph, whereas in the Western photographs is placed almost always on the left side of the image and this holds also true for the third group, *chairs*. The exceptions only seem to confirm that visual laterality changed in the course of the nineteenth and early twentieth centuries, most probably due to the influence of Western composition. There is also consistency in the leftward directionality of the scene in Persian miniatures, which gives further evidence to the visual laterality phenomenon.

1.3. Visual brain and visual perception in art

Neurologist Semir Zeki's statement that all visual art is expressed through the brain, whether in conception, execution or appreciation, and no theory of aesthetics that is not substantially based on the activity of the brain is ever likely to be complete, let alone profound⁵², made me aware of the importance of trying to understand what is happening in the brain in relation to visual art. One of my goals in this section is to find out if Zeki's theories can provide new insights into my subject.

The neurologists have learned enough about the visual brain in the last quarter of the last century to be able to say something interesting about visual art, at least at the perceptual level, as Zeki believes. He hopes that with his, in my opinion, highly interesting book *Inner Vision. An Exploration of Art and the Brain*, he can contribute to the foundations of a neurology of aesthetics or *neuro-aesthetics*, and thus for an understanding of the biological basis of aesthetic experience.⁵³ The neurobiological view that he presents in his book, is that art has an overall function, which is remarkably similar to that of the visual brain and that it is actually an extension of it and therefore obeys the same laws that govern the visual brain. Actually, everything seems to point to this emerging field becoming fundamental in the decades to come since it is a joint effort of art historians and neurologists to try to understand more about the process of production of a work of art and the role the brain and its functions plays in that process. In May 2008, an institution named *Neuroaesthetics* has been founded in Berlin, notably by leading scholars in both fields, art history and neuroscience.⁵⁴ The recently published book *World Art Studies: Exploring Concepts*

⁵² Zeki 1999, p. 1.

⁵³ Zeki 1999, p. 2.

⁵⁴ The art historians Christine Macel, curator at MNAM Centre Pompidou in Paris, the architect

*and Approaches*⁵⁵, which acknowledges in the first place art as a panhuman phenomenon, constitutes an effort to study art from all times and regions of the world in an integrative manner from a variety of disciplinary perspectives. Specially interesting for my research is the article written by the neuroart-historian John Onians, “Neuroarthistory: Making More Sense of Art”, in which he explains with examples why a neuroscientific approach is likely to contribute deeply to the world art studies. As Onians state, if we know something of the factors that might have affected the unconscious mental formation of the makers and viewers of art in a particular place at a particular time, neuroscience helps us to understand how those factors might also have affected the appearance of that art. This is why neuroscience helps us to make more sense of art.⁵⁶ Onians’s recently published book *Neuroarthistory. From Aristotle and Pliny to Baxandall and Zeki*, offers an account of this new field in the human sciences: neuroarthistory.⁵⁷ The number of art historians making use of neuroscience is growing and this helps them to understand and explain better the creative process and the response to art.

In the words of Zeki, vision is an active process, not a passive one that we have long imagined it to be. Even the most elementary kind of vision is an active process. Art is in his opinion also an active process, a search for essentials; it is a creative process whose function constitutes an extension of the function of the visual brain.⁵⁸ Therefore, if we understand the connections of brain and vision, we will be able to understand better how the aesthetical experience is happening.

The most complex organ in the human body is the brain. Since ancient times, the brain's structures and functions have been prodded, observed, and experimented on. A major impetus to the study of the physical workings of the brain came in 1791, when the Italian physician and physicist Luigi Galvani (1737-1798) showed that electricity exists as a force within the brain cells. His experiments were later confirmed by the German physician and physiologist Emil Du Bois-Reymond (1818-1896) in 1850, who found that neurons emit pulses of electricity that travel at around 200 mph. The Czech anatomist Jan Evangelista Purkinje (1787-1869), in 1838, found that nerve cells consist of two parts: a nucleus similar to other cells and a set of fibers which emanate out from the nucleus - these were later identified as the axons and dendrites. In 1870, the Italian physician Camillo Golgi (1843-1926) made the observation that there were literally billions of neurons making up the central nervous system and established that the neurons in the brain sent information to the motor nerves and that information from the sensory nerves was sent to the brain for analysis. These initial discoveries paved the way for modern neuroscience, which in recent years has yielded enormous amounts of information about the physical functions of the brain. Yet, very little of the brain’s mystery has been unravelled. What is known of its characteristics is due, in large part, to the efforts of biological psychologists such as Roger Sperry (1913-1994) and Michael S. Gazzaniga. One of the brain's most intriguing aspects is its hemispheric specialization. This refers to the division of tasks within the right and left hemispheres of the brain. In humans, the left side of the brain

Tammo Prinz) and neurologists (Dr. Alexander Abbushi, Prof. Karl Einhäupl and Prof. Detlev Ganten from the Dept. of Neurosurgery of Universitätsmedizin Berlin; Prof. Ernst Pöppel, director of the Institute of medical Psychology at Ludwig-Maximilians-University Munich; Prof. Semir Zeki, professor of Neuroesthetics at University College London. Website:

<http://www.association-of-neuroesthetics.org/documents/content.php?nav=lnk0200&use=con0200>

⁵⁵ Zijlmans and Van Damme 2008.

⁵⁶ Onians 2008, p. 284.

⁵⁷ Onians 2007.

⁵⁸ Zeki 1999, p. 7.

is dominant in language and analytical skills; whereas the right side is dominant in spatial tasks, facial recognition, prosody (tonal qualities of speech), and emotion. In addition, the left hemisphere of the brain controls the right side of the body while the right hemisphere controls the left side. Also, normally the right side of the visual field is projected to the left hemisphere of the brain and the left field to the right hemisphere. The right part of the body is controlled by the dominant left half of the brain, and the left part of the body by the right half of the brain. Therefore, the left hand is controlled by the right half of the brain and the right hand by the left half of the brain. See the following diagram of the visual pathways from Ramón y Cajal's classic *Textura del sistema nervioso del hombre y de los vertebrados* (fig. 43).⁵⁹

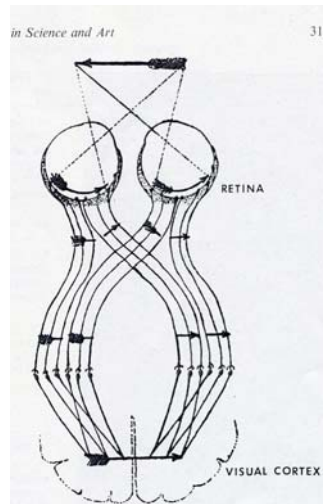


Figure 43

Note that the optics of the eye reverses the image of the arrow in the retinae. The nerve fibres from each retina separate so that messages from the left half of each retina travel to the visual cortex of the left hemisphere, and the messages from the right halves travel to the visual cortex of the right hemisphere. Thus when the center of the arrow is fixated (as shown) information in the left half of space (the arrow head) goes to the right cortex, and information in the right half of space (the feathers) goes to the left cortex. Note further that the two cortical representations are not mirror-reversed with respect to each other.

In the past thirty years, the evolution of the knowledge of the structure of the brain and its functions has been remarkable. Nowadays we know that there is a specific part of the cerebral cortex, which deals specifically with vision. It is instructive to recall, as Zeki points out, that it is only recently that neurologists accept that the retina connects with only one well-demarcated part of the brain, the primary visual cortex, and that there is therefore a localization for vision in the brain.⁶⁰

See figure 44 for a diagrammatic representation of the connections between the eye and the brain⁶¹ and figure 45 for the division of functions within the visual brain.⁶²

⁵⁹ Moya 1904. The labels have been added by Charles G. Gross and Marc H. Bernstein for their article already mentioned above.

⁶⁰ Zeki 1999, p. 16.

⁶¹ Zeki 1999, p. 15.

⁶² Taken from Zeki 1999, p. 16.

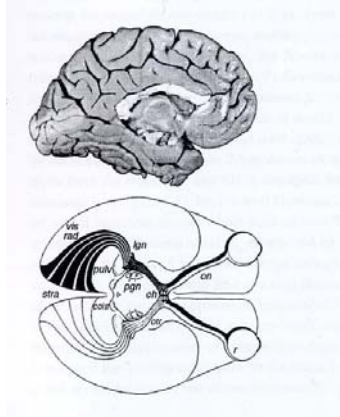


Figure 44

The fibres from the retina terminate at the back of the brain, in a part known as the primary visual cortex (area V1), shown in yellow on the medial side of the left hemisphere of the brain.

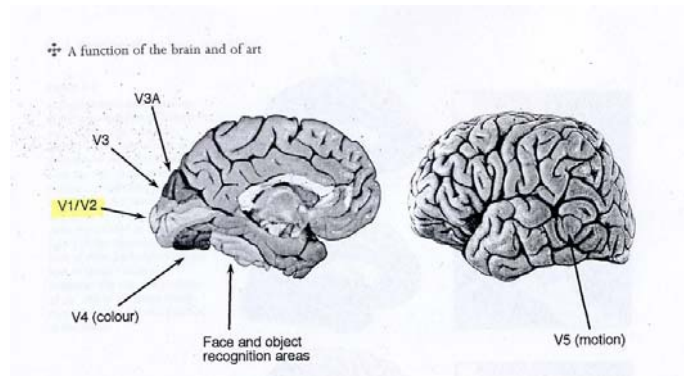


Figure 45

The visual brain consists of multiple functionally specialised areas, which receive their visual input largely from V1 (yellow) and an area surrounding it known as V2 (green). These are the best charted visual areas, but not the only ones. Other visual areas are being continually discovered.

But how can brain functionality be related to left-handedness and leftward scripts at all? This has been one of the most disturbing and confusing points in the whole process of trying to understand the visual laterality phenomenon, but an important one, since it is the linking point to connect my work with previous research in neurology.

In a recent article written by G.D. Schott and J.M. Schott, *Mirror Writing, Left-handedness and Leftward Scripts*, the authors say that they have found that a particularly high prevalence of left-handed mirror writing has been reported among those whose native languages are traditionally written in a leftward direction, including Chinese, Japanese and Hebrew. Innate lefthanders and those whose languages are written leftward thus share an unusual facility for left-handed mirror writing, an observation that may have implications for understanding hemisphere specialization in relation to handedness.⁶³

I wonder if what is said for mirror writing is also valid for mirror composition (in this case, mirror composition in photography), since in the end, it is a matter of reading and moving the eyes in one direction or the other. And in this sense, I will present the actual situation related to this topic nowadays. In their article, Schott and Schott wrote that they have observed that a surprisingly large number of reported left-handed mirror writers are those whose native languages have traditionally been written and read leftward. This is evident from various individual reports of Japanese and Chinese patients, most of whom mirror-wrote after (usually) left hemispheric vascular lesions, and the polyglot who, following a head injury, selectively mirror-wrote and read Hebrew script, while his normal reading and writing of Polish remained.⁶⁴ The high prevalence of mirror writing reported in healthy individuals and the patients whose languages are typically written and read from right to left is striking, as we can conclude after reading the above-mentioned article. The authors wrote that this finding cannot be attributed to population differences in handedness. Left-handedness is no more frequent among Asians than Westerners, and right-

⁶³ Schott and Schott 2004.

⁶⁴ Schott and Schott 2004, p. 1850.

handedness has predominated in all cultures for at least 5000 years. Both consonantal phonetic (Hebrew) and ideographic (Chinese and Japanese) languages are implicated. This suggests that, although ideographic languages are extensively processed in the right hemisphere, it is less the structure and more the leftward direction of these languages that is important and that drives, or it is driven by, the contralateral right hemisphere.⁶⁵ The neurologist JR Skyoles goes on further to state that it may well be not only the direction of writing itself but also the right hemisphere involvement in the leftward direction of eye movements and the left visual fields that are important.⁶⁶

The neurologists A. Pollatsky and S. Bolozky, did an experiment that showed that eye movements, the covert scanning of letters and mirror-image perception of words, are linked to the two visual fields. Leftward scripts (scanned with leftward eye movements) are read through the visual window extending into the left visual field (rightward ones are read through one extending into the right visual field).⁶⁷ Visual fields and eye movements are also connected to the two cerebral hemispheres. The left visual field is connected to the right hemisphere and the right with the left hemisphere. Also, each hemisphere controls eye movements directed in the opposite direction (the right hemisphere controls leftward eye movements and the left hemisphere rightward ones), so images scanned through the left visual field into the right hemisphere are also reciprocally controlled by this hemisphere.⁶⁸ Further, a group of Japanese neurologists wrote an article as an answer to the one written by Schott and Schott, in which they make a correction regarding the direction of writing in Japanese.⁶⁹ At the moment, neurologists only seem to agree on the fact that further studies in other languages are warranted, and it is especially important to investigate languages that have been variously written in leftward and rightward directions. These studies can be very relevant to further understand how this mirror-like image happens in the photographic image produced by Iranian photographers, always assuming that the mirror-writing phenomenon can be identified with the mirror-like image. Actually, in a more recent article written by GD Schott, he states that even if many individual cases of acquired mirror writing are reported among Chinese and Japanese people, these findings need to be interpreted with some caution, as the definition of leftwards direction of language is complex, and variables include the direction of the vertical and horizontal lines of script, letters and hieroglyphs, and changes in direction of written language over time,⁷⁰ in a clear reference to the corrections made by the group of Japanese neurologists.

Unlike handedness, which appears to be at least to some degree genetically determined, the direction of reading and writing seems to be merely a matter of convention. About A.D. 1500 there were as many scripts written and read from right to left as there were written and read from left to right. With the expansion of European culture in the centuries that followed, left-to-right scripts came to predominate (see McManus diagram, fig.1b). It is noted by Skyoles, that in those societies in which script direction changed, writing was not important in propagating religious beliefs. In other cultures it has taken on this role, largely through the belief

⁶⁵ Schott and Schott 2004, p. 1850.

⁶⁶ Skyoles 1992; pp. 25-26.

⁶⁷ Pollatsky et al. 1981, pp. 174-180.

⁶⁸ Skyoles 1992, p. 1.

⁶⁹ Tashiro et al. 2005, p. 834. They point out that, in contrast to Hebrew script, Japanese script (both Kanji and Kana) is traditionally written and read vertically, although the lines are read from right to left. This does not mean Japanese languages are written in a leftward direction. Japanese horizontal scripts are written from left to right, the same as alphabetic languages.

⁷⁰ Schott 2007, p. 8.

that written religious works contain the “word of God”. Since such writings are believed to be holy, it is central to the religion to propagate them unchanged.⁷¹ Skoyles suggests further that the convention of leftwardness has been preserved due to the central importance of the Torah and the Koran in the Jewish and Arabic societies, dating back to an earlier period when the leftward script, that was used to write them, reflected right hemispheric reading processes.

In sum, accepting that we can assure an intrinsically parallel phenomenon between mirror script and mirror composition in the pictorial or photographic space, I am able to benefit from this research and conclude that not only the direction of writing but also the right hemisphere involvement in the leftward direction of eye movements and the left visual fields are important and play a role in mirror-writing and, therefore, on the visual laterality phenomenon. However, further studies in other languages are warranted.

1.4. Asymmetries of the photographic space: brain mechanisms or artistic conventions?

Asymmetries of photographic space could arise, as already mentioned before, from asymmetries of the brain or from cultural conventions. Both of them seem to contribute to the anisotropy of art but in different ways. One artistic asymmetry that appears to be universal in this way is profile orientation. Portraits are rarely full-face.

One pioneer study made by the neurologists Chris McManus and N.K. Humphrey, found that the majority face leftward in 1474 painted portraits produced in Western Europe between 1500 to the present.⁷² I am not aware of a similar study made with non-Western paintings. But I have so far gone through around 300 Western studio portrait photographs from the nineteenth-century and most of them, indeed, face leftwards. Similarly, with Iranian portraits I see that there are much more examples of profile orientation in the rightward direction. This difference may be related to the directionality of writing and reading again, but further research must be done in order to be able to extract solid conclusions.

The neurologist Hans-Joachim Hufschmidt asserts that eighty percent of right-handers drawing a human profile direct it towards the left. The preference for the left profile direction is traced back to the early Greek period in paintings, drawings, coin portraits, gems, cameos, and vase portraits. Fifty thousand objects have been analyzed. A 60% prevalence of face direction towards the right occurs in cultural centers of the Mediterranean before 600 B.C. Before the early Greek period, the Assyrian, Egyptian, and Sumerian cultures faced more profiles to the right. This tendency for the right profile direction can be traced back to Stone Age cave drawings. The profile shift from right to left occurs in the early Greek period and is related to a shift in script and in letter profile at the same time. This profile shift occurs simultaneously with an acceleration of intellectual and cultural development, which also influenced our present culture.⁷³

So profile orientation appears to be a function of brain laterality, not direction of reading, suggest Gross and Bernstein. Nevertheless, it is not possible to reach such a conclusion before further experiments are done considering subjects literate in right-to-left scripts. When a face is fixated centrally, the half of the face in the left visual

⁷¹ Skoyles 1998.

⁷² McManus and Humphrey 1973.

⁷³ Hufschmidt 1980.

field is processed by the right hemisphere. As stated by the neurologists C. Gilbert and P. Bakan, face recognition is a right hemisphere function and, when right-handed people look at the two halves of a front view of a face, the half of the face in the left visual field looks much more “like the person” than the other half.⁷⁴ Thus the tendency for portraits to locate profiles in the left visual field presumably reflects the fact that facial information would be perceived more readily and accurately by the majority of people (i.e., right-handers). Similarly, as shown in figure 46, it is the expression on the half of the face in the left visual field that usually determines the right-handed viewer’s impression of it.⁷⁵ Although the faces are enantiomorphic⁷⁶, right-handers tend to see the lower face happier than the upper one, whereas the reverse is true of left-handers.

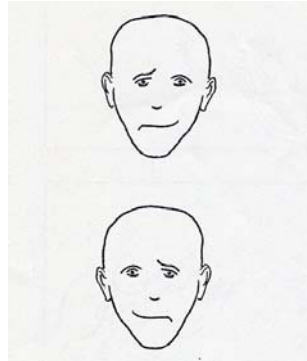


Figure 46

Stare at the nose of each face. Which looks happier? J.Jaynes found that most right-handers choose the bottom face with the smile in their left visual field, presumably because the smiling side is processed by the right hemisphere on central fixation.⁷⁷

In contrast to profile orientation, other aspects of visual anisotropy appear to reflect cultural conventions. Wölfflin suggested that individuals typically enter a picture at the left foreground and proceed along a specified path or “glance curve” into the depth of the picture and over to its right-hand side.⁷⁸ He points out how this direction scan lends an aesthetic dimension of movement in graphic art. Movement from left to right in a painting is perceived as easier and faster, while movement from right to left is slower and perceived as having to overcome resistance. The former signals attack or approach; the latter signals withdrawal. In addition, the diagonal “/” is often associated with ascent and triumph, while “\” is associated with descent and defeat. Wölfflin believed that the left-to-right glance curve represented a fundamental aesthetic vector. However, the glance curve in Oriental art appears to be in the opposite direction, as I have already shown earlier in this article with some examples

⁷⁴ Gilbert and Bakan 1973.

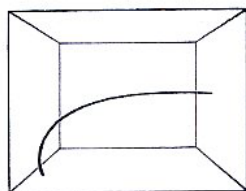
⁷⁵ Gross and Bronstein 1978, p. 35.

⁷⁶ *Enantiomorphs* is the mathematical term for two things which have contrary shapes. Also the term *incongruent counterparts* (objects that are perfectly similar in shape except for being mirror images of each other, such as left and right human hands) is widely used in the scientific literature instead of *enantiomorphs*. Immanuel Kant was the first great thinker to point out the philosophical significance of such objects. He called them *counterparts* because they are similar in nearly every way, *incongruent* because, despite their similarity, one could never be put in the place of other. Further reading: Van Cleve J and Frederick RE, *The Philosophy of Right and Left. Incongruent Counterparts and the Nature of Space*, Canada, 1991.

⁷⁷ From Jaynes 2000, p.120.

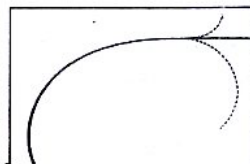
⁷⁸ Gross and Bornstein 1978, p. 36.

of Iranian paintings and engravings. Thus the direction of the glance curve in both painting and theatre (as we have pointed out above) appears to be a cultural convention, presumably related to the direction of reading, and we believe that the same is true for photography. The form of this path is best represented by the curve shown in figures 47a and 47b. Figure 47b shows the curve as seen from above; figure 47a shows it as seen in perspective. It begins in the left foreground, penetrates towards the depth, then turns over towards the right.⁷⁹



A

Figure 47a



B

Figure 47b

Gaffron states that to follow the glance curve seems to be our natural way of viewing - so natural, in fact, that the process remains unconscious and we become aware of it only by its effects, which cause the above mentioned phenomenal changes on reversal.⁸⁰ But, as Gross and Bornstein suggest, the term “glance curve” may be a misnomer, since studies of eyes movements across both Eastern and Western pictures do not reveal glance curves in either direction.⁸¹ Rather such studies suggest that the eye roams over a picture in an arbitrary manner, only stopping to rest on salient features. The glance curve may be some kind of covert cognitive scanning with its direction set by reading habits. Or, alternatively, it may reflect a cultural organizing principle implicit in graphic art.⁸² The results of a recent study made by the neurologists W. H. Zangemeister, K. Sherman and L. Stark⁸³ seem to demonstrate that those classical studies’ conclusions were, indeed, wrong. Scanpaths, the repetitive sequences of saccadic eye movements, occurred when subjects viewed slide projections of both realistic and abstract art, a result that contrasts with previous theories that suggested that the eye moves freely over a picture in an arbitrary manner. As stated by this group of researchers in the conclusion of their paper, the eye movement experiments reported here of subjects looking at abstracts paintings have shown that abstract images are viewed by the same top-down, perceptual-cognitive processes that drive active looking or scanpaths in viewing realistic paintings, scenes and objects.⁸⁴

In sum, it seems that the glance curve theory is not accepted, since it contradicts the results found with recent eye scanning experiments done by neuropsychologists. Asymmetries of the painting and/or photographic space do arise from asymmetries of the brain and from cultural conventions. One artistic asymmetry that appears to be universal is profile orientation. It has been demonstrated that in the majority of

⁷⁹ Gaffron 1950, p. 317.

⁸⁰ Gaffron 1950, p. 317.

⁸¹ Buswell 1935; Noton and Stara 1971; Yarbus 1967.

⁸² Gross and Bornstein 1978, p. 35.

⁸³ Zangemeister 1995.

⁸⁴ Zangemeister 1995, p. 1023.

Western paintings the face is shown in the leftward direction. A replica of McManus experiment should be undertaken with paintings done by artists literate in a right-to-left script language.

1.5. Reading habits versus aesthetic preferences: a neurological approach

In the previous sections, I have made an historical survey of the perspective of art historians towards the left-right phenomenon. Next to this, I made an introduction to the main contributions of neurologists to the possible relation of left-handedness with leftwards scripts and also about the phenomenon of mirror writing. Now I will present a historical survey of the positioning of neurologists towards the more concrete topic of reading habits and aesthetic preferences, which links the two relevant fields for this research: art history and neuroscience.

There is a large corpus of literature on the asymmetrical placing of the preference, in the West, for the centre of gravity to the right of the centre. This literature, as we shall see shortly, has a great deal of discussion about why the basic spatial asymmetry occurs in addition to the now rather discredited idea of a glance curve. There are some fundamental studies related to this topic whose conclusions I will introduce chronologically and that are relevant for my own study, since they support my visual laterality hypothesis. From the middle of the 1970s onwards this topic became a main issue for scholars in the field of neurology and nowadays it remains an important topic in the field. Much has been achieved and demonstrated, but there are still several obscure points that deserve further study.

Research has demonstrated that there is a significant effect of reading habits on aesthetic preference, with left-to-right readers showing a preference for stimuli with a rightward directionality while right-to-left readers preferred stimuli with a leftward directionality. These findings raise the question of an interaction between cultural factors and cerebral dominance, as we have already pointed out before. For the cerebral dominance part, one pioneer, the American neurologist Jerre Levy on the field of lateral dominance and aesthetical preference, supports the hypothesis that lateral specialization of the cerebral hemispheres affects preferences for one of two mirror symmetric pictures. As stated in the discussion of that paper, while preferred choices of one group of right-handers predict choices of another group of right-handers, the predictive validity for a group of left-handers is essentially zero. Slightly over 40% of sinistrals prefer mirror versions of pictures opposite to the choice of the dextrals.⁸⁵ These observations are similar to those of neurologists Swartz & Hewitt who found a very small, but significant, majority of right-handers preferred the original versions of famous paintings as compared with their mirror images, while left-handers did not.⁸⁶ Later on, another article was published on this topic by the neurologists Marily Freimuth and Seymour Wapner that contributed to perceptual and aesthetic theory by demonstrating that two factors influence the evaluation of paintings: sequence of figures and exposure time (meaning here, how long the viewer is observing the figure). It concluded that asymmetrical factors are predominantly operative in perception and aesthetic judgments made after brief observations. These asymmetries influence evaluations only for paintings with dominant directional properties measured by lateral organization. With longer exposure time (and this is

⁸⁵ Levy 1976, p. 436.

⁸⁶ Swartz & Hewitt 1970, p. 991.

relevant for my study) other cognitive factors (e.g. conceptual, symbolic analyses) become increasingly influential.⁸⁷ So, cultural conventions became only a factor of importance after longer exposure time. They found that pictures with implied motion from left-to-right are preferred to those with implied motion from right-to-left. Further in this line of research, the American neuropsychologist J. Graham Beaumont, argued as a conclusion of an experimental observation that lateral asymmetry in preferred picture arrangements is not the result of a counterbalancing of content against perceptual bias, but a consequence of gaze being directed to informative content on the right, leaving more of the secondary content within the left visual field and associated with attentional bias or processes of the right hemisphere.⁸⁸ He further concluded that it is therefore the operation of neuropsychological processes related to the peripheral elements of the visual array, those outside central vision, which best explain the association between aesthetic preferences and features of lateral neuropsychological dominance.⁸⁹

In the same year, an article about the subjective balance in pictures was published by the neurologists I.C. McManus, D. Edmodson and J. Rodger, that showed that when pictures used for the experiment showed large differences in balance point, subjects showed smaller differences, unrelated to handedness or eye-dominance⁹⁰, a conclusion which provides no support for the position of Levy (introduced above). Further, the neurologists Marie T. Banich, Wendy Heller and Jerre Levy, taking into consideration Freimuth and Wapner's study, suggested that the preference of slides with apparent motion from right-to-left deserved comment. After pursuing their experiment, they were able to conclude that: first, it appears that left-to-right scanning habits induced by reading do not induce preference for asymmetry of motion in their slides, because right-handers preferred slides with right-to-left motion and because the orientation preference of left-handers was unrelated to asymmetry of motion; second, that their findings differ from those of Freimuth and Wapner, who found that preferred slides were judged to have relative motion from left-to-right.⁹¹ They point out, however, that in Freimuth and Wapner's study, the slides did not have a significant asymmetry of content, implying with this that it may be that right-to-left motion is only preferred where there is a significant asymmetry of content. It has also been reported by Beaumont (unpublished data) that subjects preferred pictures of horses when they were jumping towards the center of the picture. If the horse was placed to the right of center it was preferred when jumping to the left; conversely, if the horse was placed to the left of center, it was preferred when jumping to the right.⁹²

As we have already seen, observers often prefer orientation of a stimulus over its mirror image and this preference, as stated by neurologists S. Christman and K. Pinger, for left-to-right directionality may represent a fairly deep and pervasive aspect of mental representations and processes.⁹³ The neurologists Chatterjee, Maher and Heilman reported that when normal subjects are asked to draw stick figures depicting the thematic roles of agent and patient, they exhibited a consistent bias to place the agent on the left and the patient on the right, thus displaying a left-to-right pattern of

⁸⁷ Freimuth & Wapner 1979, 70, p. 218.

⁸⁸ Beaumont 1985, p. 103.

⁸⁹ Beaumont 1985, p. 112.

⁹⁰ Mc Manus et al 1985, 76, p. 311.

⁹¹ Banich et al. 1989, p. 193.

⁹² Banich et al. 1989, p. 194.

⁹³ Christman & Pinger 1997.

causality.⁹⁴ Further, Christman and Pinger state that, in the same way, there is evidence that scanning patterns in visual search proceed rightward from fixation.⁹⁵ Finally, saccadic latency is less for left-to-right movements than for right-to-left.

Collectively, these findings are suggestive of a deep, underlying preference for left-to-right directionality in both perceptual and motor processes. Nevertheless, as stated by Christman and Pinger, an unresolved question concerns the relation between the aforementioned directional biases and the left-to-right scanning involved in reading. That is, do the aforementioned preferences for left-to-right directionality simply reflect the influence of learned preferences arising from left-to-right reading habits, or is there some more fundamental directional bias that underlies all of these phenomena? They finish their reflection stating that future research involving multiple tasks and/or subjects who read right-to-left language will be necessary to address this issue.⁹⁶ This is, indeed, extremely interesting for my research. One of the fundamental studies done at the beginning of the present decade is the one by neurologists Sylvie Chokron and Maria de Agostini.⁹⁷ The aim of that study was to determine the extent to which aesthetic preference, previously attributed to cerebral dominance, may be determined by reading habits. In order to achieve that, they submitted left-to-right (French) and right-to-left (Israeli) readers to a visual aesthetic preference task. Subjects were presented pairs of object pictures: one with a left-to-right directionality and the other with right-to-left directionality. As they stated in their discussion, the main finding of the present experiment is an effect of reading habits on aesthetic preference, with subjects preferring the pictures possessing the same directionality as their reading habits.⁹⁸ Therefore, reading habits are able to influence visual preferences and even the way we mentally represent the world. Only three years later, an article about this topic was published by the neurologists Jacqueline Fagard and Riadh Dahmen.⁹⁹ They compared the influences of reading and writing habits on the asymmetry of space perception and the directional tendencies of French and Tunisian right-handers, aged 5, 7 and, 9 years. By comparing two groups of children who use the opposite direction for writing, before and after being taught to read in school, they evaluated the impact of writing direction on these asymmetries. In their conclusion, they state that basic influences appear to be similar in young children with differing reading and writing habits, which becomes obvious after some practice in writing, overrides these more basic influences. When the two influences are compatible (as when left-right writing favours the pre-existing leftward bias and the left-to-right hand bias), the bias appears stronger and earlier. When the two types of influence are opposed (with right-left writing), there is less and sometimes no bias. The lack of a bias in the Tunisian children on two of the three tasks might also reflect the influence of learning French.¹⁰⁰

This unclear topic has been addressed in this decade remarkably by a group of neurologists from the American University of Beirut (Lebanon). There are some classic studies¹⁰¹ on this topic of reading habits that are important to read. This group

⁹⁴ See: Chatterjee et al. 1995.

⁹⁵ Christman & Pinger 1997, p. 174.

⁹⁶ Christman & Pinger 1997, p. 174.

⁹⁷ Chokron & De Agostini 2000.

⁹⁸ Chokron & De Agostini 2000, p. 48.

⁹⁹ Fagard & Dahmen 2003.

¹⁰⁰ Fagard & Dahmen 2003, p. 50.

¹⁰¹ See: Dreman, S.B., "Directionality Trends as a Function of Handedness and of Reading and Writing Habits", in *American Journal of Psychology*, 87 (1), 1974, pp. 247-254; Bryden, M.P.,

of researchers advocates the need to acknowledge script as a variable when examining hemispheric asymmetries when employing non-linguistic stimuli, as its influence has been demonstrated by their different experiments including right-to-left script users. The neurologists Robin L. Heath, Aida Rouhana and Dana Abi Ghanem, from the American University of Beirut in Lebanon, have performed two research experiments whose results were published in two different papers in 2005.¹⁰² In the first experiment they selected three groups of subjects: white Americans, bidirectional readers and Arabic readers. They used the asymmetric chimeric faces test (I introduced it in the previous section, page 18) and they found that readers of right-to-left scripts showed a mixed or weak rightward bias in judgments of facial affect which supports again the influence of habitual scanning direction to intersect with laterality.¹⁰³ The second experiment was also done with the same three groups of subjects as in the first one, plus one more group of illiterates. Their findings showed that biases in aesthetic preference were influenced by script direction and pictorial dimensions. In a laterally balanced composition, participants preferred to begin their scan with the object representing Interest and terminate with the object representing Weight, the direction being determined by the script. In an unbalanced composition, participants tended to fixate on content, whether Interest or Weight, and move in a direction consistent with the script.¹⁰⁴ Nowadays, according to the results of my investigation, there are at the moment two groups of scholars working on direction of script and aesthetic preferences or perception: Dr. J. Vaid at Texas A & M and her colleagues are working with Urdu script (also right to left). She was doing work with drawing the profiles of human heads. Steve Christman at the University of Toledo is also researching aesthetics and reading direction.

In sum, all the previous studies constitute a solid theoretical basis that supports my visual laterality hypothesis. A large amount of research in the field of neuropsychology has demonstrated that there is a significant effect of reading habits on aesthetic preference, with left-to-right readers showing a preference for stimuli with a rightward directionality while right-to-left readers preferred stimuli with a leftward directionality. Nevertheless, in order to fully probe the validity of my hypothesis, an experiment should be made to collect objective data that could be replicated by any research team that would undertake the same experiment.

“Left-Right Differences in Tachistoscopic Recognition: Directional Scanning or Cerebral Dominance?”, in *Perceptual and Motor Skills*, 1966, 23, pp. 1127-1134; Ghent Braine, Lila, “Asymmetries of Pattern Perception Observed in Israelis”, in *Neuropsychologia*, 1968, Vol. 6, pp. 73-88; Blount, Patricia, Colmes, Janet & Rodger, Hill, “On the Ability to Discriminate Original from Mirror-Image Reproductions of Works of Art”, in *Perception*, 1975, Vol. 4, pp. 385-389; Kugelmass, S. & Lieblich, A., “Impact of Learning to Read on Directionality in Perception: A Further Cross-Cultural Analysis”, in *Hum. Dev.* 22, 1979, pp. 406-415;

¹⁰² Heath et al. 2005. Heath et al 2005 B.

¹⁰³ It must be noted that the same conclusions were already achieved with an experiment made 25 years ago by the neurologists Joytsna Vaid and Maharaj Singh. Perceptions of happy facial affect from asymmetric composite faces presented in free vision were compared in four groups: left-to-right readers (Hindi), right-to-left readers (Arabic and Urdu), left-to-right and right-to-left readers (Hindi/Urdu) and illiterates (Hindi/Urdu). The leftward bias was present in a significant larger proportion of Hindi than Urdu or Arabic readers. These results are taken to reflect an interaction between a cerebral laterality effect and a directional scanning effect in facial affect judgement. See: Vaid, J. & Singh, M., “Asymmetries in the Perception of Facial Affect: Is There an Influence of Reading Habits?”, in *Neuropsychologia*, Vol. 27, No. 10, 1989, pp. 1277-1287.

¹⁰⁴ Heath et al. 2005, p. 399.

As a conclusion to the research done for this chapter, I can state that the direction of the script is directly related to the composition of works of art. Therefore, the direction of writing is one of the cultural components that constitute a photograph. There is a tendency in nineteenth-century Iranian photographers to produce mirror like images of those produced by their Western colleagues. This tendency has been proven to be consistent in the three groups of composition that I have analyzed throughout the chapter. The state of the discourse in the field in neurology is, nowadays, still full of unanswered questions and we will have to wait and see how it will develop with time, to test if we can profit from future findings to be able to explain the visual laterality phenomenon. Different groups of neurologists have concluded, after pursuing statistical experiments, that not only the direction of writing but also the right hemisphere involvement in the leftward direction of eye movements and the left visual fields are important and play a role in mirror-writing and, therefore, on the visual laterality phenomenon. Leading scholars in the field of neuroscience advocate the need to acknowledge script as a variable when examining hemispheric asymmetries, as its influence has been demonstrated by their different experiments including right-to-left script users. The last studies point to the fact that there is an interaction between cultural factors (reading habits) and cerebral dominance when considering the visual laterality hypothesis. The fact that those studies acknowledge the script as a variable in perceptual lateral asymmetries gives a solid theoretical support to my hypothesis from a neuroscientific approach.

In the following chapters I will extend the process of analysis of images to find other cultural components involved in the process of producing a photograph.