Perception and experience of the self in autoscopic phenomena and self-portraiture[1]

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Summary

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Autoscopic phenomena are reduplicative experiences during which the subject has the impression of seeing a double in extracorporeal space either from an embodied or disembodied visuo-spatial perspective. Autoscopic phenomena include out-of-body experience (OBE), autoscopic hallucination (AH) and heautoscopy (HAS). In an out-of-body experience, subjects feel that their "self", or centre of awareness, is located outside the physical body and somewhat elevated. It is from this elevated extracorporeal location that subjects experience seeing their body and the world. An autoscopic hallucination is defined as the experience of seeing a double of oneself in extracorporeal space without leaving one's body (no disembodiment). As compared to out-of-body experiences, individuals with autoscopic hallucination experience seeing the world from their habitual visuo-spatial perspective and experience their "self", or centre of awareness, inside their physical body. During heautoscopy subjects also have the experience of seeing a double in extracorporeal space (as in autoscopic hallucination). However, it is difficult for the subject to decide whether he is disembodied or not and whether the self is localised within the physical body or in the double. The present review highlights recent findings concerning phenomenological and neurocognitive characteristics of autoscopic phenomena of neurological origin. These findings are compared with the pictorial phenomenology of self-portraits, which may also be described as reduplicative phenomenona because self-portraits contain the painter twice: as the painting painter and the painted painter (double). The comparative analysis between the three forms of autoscopic phenomena and self-portraits revealed several phenomenological similarities suggesting that some of the neurocognitive mechanisms of autoscopic phenomena might also be employed by artists of self-portraits as well as beholders of such works of art. Based on this analysis a division of the genre of self-portraiture in three major types of self-portraits is proposed that reflects the characteristics of out-of-body experience (OBE self-portraits), autoscopic hallucination (AH self-portraits) and heautoscopy (HAS self-portraits). It is argued that autoscopic phenomena, which have fascinated mankind from time immemorial, might add to our understanding of the central processes that mediate self-perception and self-experience in cognitive neuroscience as well as art history.

Keywords: autoscopic phenomena; out-of-body experience; art; painting; self; self-portraiture

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Chacun de nous, sa vie durant, ne cesse de
s'étonner d'être précisement celui qu'il est.
Le drame de l'unicité est inépuisable et insoluble.

Cioran, *Cahiers 1957–1972* (1997)

Autoscopic phenomena

Definition of autoscopic phenomena

Visual disorders of the body image or somatognosia include a variety of usually short-lasting, illusory experiences about the seen location and position of one's body or body parts in space [1–7]. They mostly occur in patients with posterior brain damage and are characterised by illusions that only affect a certain body part (visual body-part illu-

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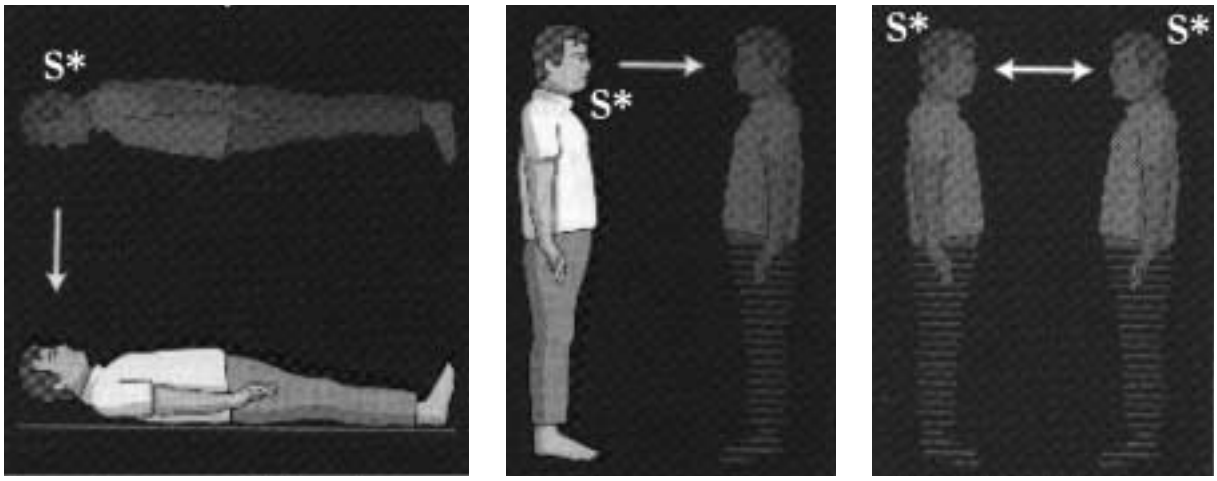
Figure 1 Phenomenology of autoscopic phenomena. This figure illustrates the phenomenology of the three autoscopic phenomena autoscopic hallucination (B), heautoscopy (C) and out-of-body experience (A) with respect to visuo-spatial perspective (arrow), self-location and autoscopy. The position and posture of the self is indicated for each autoscopic phenomenon by an S* that is drawn next to the body where the self is perceived. The position of the physical body of the subject is indicated as the non-transparent body. The transparent body represents the illusory body. Note that the self–body distinction is ambiguous. Accordingly both depicted bodies are marked with an S* and are transparent. The direction of the visuo-spatial perspective is indicated by the direction of the pointing arrow. In autoscopic hallucination the visuo-spatial perspective is body centred, in out-of-body experience it is from a disembodied position and in heautoscopy it is either simultaneous or alternating between physical and disembodied locations (see text for further explanations; modified from Blanke [16]).



A B C

sions) or the entire body (visual body illusions or autoscopic phenomena). Thus, with respect to the upper extremity, a variety of visual body-part illusions such as disconnection, dislocation, movement and reduplication have been described due to neurological brain damage [6–11]. Yet, whereas these different visual body part illusions have been investigated neuroscientifically – leading to scientific explanations and insights into central mechanisms as well as new treatments – much less is known about visual body illusions that affect the entire body (autoscopic phenomena). Moreover, given the rarity of autoscopic phenomena, the widespread neurological literature and the complex phenomenology of autoscopic phenomena they have only recently been classified systematically. We have recently analysed the phenomenological, functional and anatomical similarities and differences of the three main forms of autoscopic phenomena: out-of-body experience, autoscopic hallucination and heautoscopy. This division into three distinct autoscopic phenomena was initially developed by Devinsky et al. [12] and subsequently extended by Grüsser and Landis [13], Brugger et al. [10], Brugger [14] and Blanke et al. [15, 16].

In out-of-body experiences people seem to be awake and feel that their "self", or centre of awareness, is located outside of the physical body and somewhat elevated. It is from this elevated extracorporeal location that the subjects experience seeing their body and the world [12, 14, 16–18]. The subject's reported perceptions are organised in such a way as to be consistent with this elevated visuo-spatial perspective. The following example from Lunn [9] (case 1) illustrates what subjects experience during an out-of-body experience:

"Suddenly it was as if he saw himself in the bed in front of him. He felt as if he were at the other end of the room, as if he were floating in space below the ceiling in the corner facing the bed from where he could observe his own body in the bed. […] he saw his own completely immobile body in the bed; the eyes were closed." (p. 122)

An out-of-body experience can thus be defined as the presence of the following three phenomenological elements: the feeling of being outside one's physical body (or disembodiment); the presence of an elevated and distant visuo-spatial perspective; and the seeing of one's own body (or autoscopy) from this perspective. These three aspects are illustrated in figure 1A.

An autoscopic hallucination is defined as the experience of seeing a double of oneself in extracorporeal space without leaving one's body (no disembodiment). As compared to out-of-body experiences, individuals with autoscopic hallucination experience seeing the world from their habitual visuo-spatial perspective and experience their "self", or centre of awareness, inside their physical body (fig. 1B). The following example is taken from Kölmel [19] (case 6):

"[…] the patient suddenly noticed a seated figure on the left. 'It wasn't hard to realize that it was I myself who was sitting there. I looked younger and fresher

than I do now. My double smiled at me in a friendly way.'" (p. 31)

The third form of autoscopic phenomena is heautoscopy, which is an intermediate form between autoscopic hallucination and out-of-body experience. The individual experiencing an heautoscopy also has the experience of seeing a double of himself in extracorporeal space (autoscopy). However, it is difficult for the subject to decide whether he is disembodied or not and whether the self is localised within the physical body or in the double [16, 20]. In addition, the subjects often report to see in an alternating or simultaneous way from different visuo-spatial perspectives that fluctuate between the subject's and the double's body as reported by Blanke et al. [16] (case 2) (fig. 1C): *"[The patient] has the immediate impression as if she were seeing herself from behind herself. She felt as if she were 'standing at the foot of my bed and looking down at myself'. Yet, […], the patient also has the impression to 'see' from her physical [or bodily] visuo-spatial perspective, which looked at the wall immediately in front of her. Asked at which of these two positions she thinks herself to be, she answered that 'I am at both positions at the same time'."* (p. 247–8)

In summary, the three forms of autoscopic phenomena differ with respect to the three phenomenological characteristics of disembodiment, visuo-spatial perspective and autoscopy. Whereas there is no disembodiment in autoscopic hallucination and always disembodiment in out-of-body experiences, subjects with heautoscopy generally do not report clear disembodiment, but are unable to localise their self or centre of awareness with precision. Thus, in some patients with heautoscopy the self is localised either in the physical body or in the autoscopic body, or at two positions at the same time (i.e. bilocation). Accordingly, the visuo-spatial perspective is embodied in autoscopic hallucinations, disembodied in out-of-body experience, and at varying disembodied and embodied positions in heautoscopy. Autoscopy is present in all autoscopic phenomena (for further details see [10, 16]). Only during autoscopic hallucinations does the subject immediately realise the illusory nature of the experience, whereas heautoscopy and out-of-body experiences are generally described as highly realistic experiences [14, 16, 20].

Neurocognitive mechanisms in autoscopic phenomena

Although most neurological authors agree that autoscopic phenomena relate to a paroxysmal pathology of own body perception and cognition, it is not known which of the many senses implicated in body perception and cognition are primarily involved in the generation of autoscopic phenomena and whether there are differences between the three main forms of autoscopic phenomena. Thus, some authors postulated a dysfunction of visual processing [21, 22]. Visual theories considered autoscopic phenomena to be visual or "specular" hallucinations based on the fact that they were experienced and described by most patients spontaneously as visual manifestations [21, 22]. In addition, especially autoscopic hallucinations, may sometimes be lateralised in the visual field and are frequently experienced as visual pseudohallucinations [10, 16, 20]. However, a number of arguments show that a purely visual explanation cannot account for autoscopic phenomena in general. First, although all three forms of autoscopic phenomena are spontaneously described as visual, they are also frequently described as veridical experiences (especially heautoscopy and out-of-body experiences) and not as pseudohallucinations [1, 8, 10, 16, 23]. Second, patients and healthy people reported that the impression of reality and self-recognition is preserved even if visual details of the autoscopic body during the autoscopic phenomena differ from the patient's actual appearance (such as clothes, age, hair cut, size, colouring of the body [12, 16, 19, 24–26]. In some patients self-recognition may even be immediate if the patient only sees his back during the autoscopic phenomena [12, 16].

These data point to the importance of non-visual, body-related, mechanisms in autoscopic phenomena, such as *proprioceptive* and/or *kinaesthetic* processing, as was already argued by Sollier [24] (for later discussions see also [1, 2, 10, 16]). Latter authors proposed that the involvement of disturbed processing may differ between the three main forms of autoscopic phenomena. Sollier for instance differentiated heautoscopy (or "autoscopie dissemblable") from autoscopic hallucination (or the "autoscopie spéculaire" of previous authors such as Féré [21]) suggesting that both forms of autoscopic phenomena might relate to different cerebral mechanisms. He postulated the latter to be a mere visual hallucination, whereas he assumed the former to be a proprioceptive-kinaesthetic disturbance associated with a strong psychological affinity between physical and autoscopic body. For proprioceptive-kinaesthetic processing he coined the term "cenesthesia" (as the body's visceral and deep sensations) stating that autoscopic hallucination and heautoscopy are due to the "projection of the body's visceral and deep

sensations into the space on the outside of the body" [24]. Several authors have also highlighted the role of proprioception and kinaesthesia in autoscopic phenomena by noting that some patients report about shared movements between the physical and the double's body (autoscopic echopraxia) [1, 2, 8, l0, 25]. A further argument in favour of tactile and proprioceptive mechanisms in autoscopic phenomena was given by Blanke et al. [16] who reported that the body position of the patient prior to autoscopic hallucination/heautoscopy (erect) and out-of-body experience (supine) differs suggesting a differential influence of proprioceptive and tactile processing on autoscopic phenomena.

Another sensory system, which has been linked to autoscopic phenomena, is the *vestibular* system that conveys bodily sensations to the brain. Thus, the inspection of case collections of autoscopic phenomena in healthy subjects reveals the frequent association of vestibular sensations with autoscopic phenomena (e.g. [17, 18, 26–28]). Whereas Bonnier [29] and Skworzoff [30] simply observed the frequent association of vestibular sensations in otological and neurological patients with autoscopic phenomena, others proposed that a paroxysmal central vestibular dysfunction might be an important mechanism for the actual generation of autoscopic phenomena [1, 10, 13, 23]. Menninger-Lerchenthal [1] extended this view and pointed to the importance of vestibular disorders in the generation of visual illusions, visual dysfunctions, as well as autoscopic phenomena. On clinical grounds Blanke et al. [16] suggested a differential implication of vestibular processing in the different forms of autoscopic phenomena. These authors proposed systematic differences in the strength of a vestibular dysfunction in autoscopic hallucination, heautoscopy and out-of-body experiences. Based on phenomenological evidence, Blanke et al. [16] showed that out-of-body experiences were associated with a gravitational, otholithic, vestibular disturbance, whereas the vestibular dysfunction in patients with heautoscopy was more variable and often characterised by rotational components, and vestibular dysfunction was absent in these patients.

Finally, many patients with autoscopic phenomena also experience paroxysmal visual body-part illusions [1, 2, 8, 9, 12, 31, 32] and this has led several authors to argue for a similar or closely related functional and anatomical origin of visual body-part illusions and visual illusions of the entire body [1, 2, 8, 10, 23].

With respect to aetiology, autoscopic phenomena have been reported in various focal and generalised diseases of the central nervous system. Generalised neurological aetiologies include cerebral infections such as meningitis and encephalitis, intoxications, as well as generalised epilepsies [1, 2, 8, 10, 12, 13, 16, 23, 25, 33]. Autoscopic phenomena following focal brain damage emerge from a large variety of aetiologies including focal epilepsy [12], traumatic brain damage [34] and migraine [35] as well as less often vascular brain damage [19] and neoplasia [34].

Regarding their underlying anatomy, autoscopic phenomena of focal origin primarily implicate posterior brain regions and with respect to the lobar anatomy most studies found the parietal, temporal or occipital lobe to be involved [8–10, 12, 34]. Some of these authors have either suggested a predominance of temporal lobe involvement [12, 13, 33], a predominance of parietal lobe involvement [1, 2, 8] or no precise brain localisation at all [36]. Yet, Menninger-Lerchenthal [1] speculated on different anatomical substrates for the different autoscopic phenomena, suggesting autoscopic hallucination to originate at the junction of the parietal and occipital lobe (junction of Brodmann's areas 19 and 39), heautoscopy originating from the angular and supramarginal gyrus (Brodmann's areas 39 and 40) and out-of-body experiences from the superior parietal lobule (Brodmann's area 7). These anatomical dissociations have partly been confirmed by Blanke and colleagues [16] showing that heautoscopy and out-of-body experiences are related to damage to the temporo-parietal junction and autoscopic hallucination to damage at the temporo-occipital junction. In addition, the temporo-parietal junction was found to be activated during mental own-body imagery reflecting imagery self-location and -perspective that is experienced spontaneously during out-of-body experiences [37, 38]. Finally, with regard to predominant hemispheric involvement the reported data are quite divergent. Some authors found no hemispheric predominance for autoscopic phenomena [8, 12, 33], while others have suggested a right hemispheric predominance for these phenomena [1, 10, 13, 23]. Brugger et al. [10] proposed that autoscopic hallucination has a right hemispheric predominance, but did not analyse patients with heautoscopy or out-of-body experiences. Based on a review of the literature Blanke and Mohr (submitted) confirmed Brugger's finding for autoscopic hallucination and suggested that out-of-body experiences are mainly related to right hemisphere damage and heautoscopy mainly to left hemisphere damage.

In the remainder of the article I have examined whether some of the characteristics as described for autoscopic phenomena may also be found in

self-portraits of professional painters. For this purpose I have analysed self-portraits ranging from the 15th to the 20th century and propose a division of the genre of self-portraiture into three distinct parts: self-portraits that reflect the characteristics of autoscopic hallucination (AH self-portraits), out-of-body experience (OBE self-portraits) and heautoscopy self-portraits respectively.

Self-portraiture

Reduplication of body and self in self-portraiture and autoscopic phenomena

Whereas artists generally paint portraits of other people by direct inspection, the painter of a self-portrait cannot inspect himself (or can at least not inspect his entire body and his face) directly with his eyes only. To achieve visual self-inspection and paint their self-portraits painters throughout time have often relied on mirrors as well as mental imagery[1] pointing to the possibility of functional differences between portraits of other people and portraits of oneself. Although it has been stressed that the reflecting mirror is implicitly present in all self-portraits [39, 40], the role of mental imagery is also important as stated by Caspar David Friedrich: "Close your corporeal eye so that you see your painting first with your inner eye. Then bring onto the painting what you have seen in the darkness so that it can impress others from the outside to their inside."[2] Accordingly, art historians have distinguished between portraiture and self-portraiture as being two different genres: "the painter has seen himself become his model in the mirror that faces him"[3] [42].

In the present article I will argue that self-portraits are interesting study material for the cognitive neuroscientist who tries to understand autoscopic phenomena as well as body awareness and self-perception [1, 39]. This is because self-portraits contain the body and self that interest the cognitive neuroscientist in two ways: as the painted painter and as the painting painter [43]. It is this dissociation in self-portraits between the double (the painted painter) and the artist (the painting painter) that gives rise – according to Lejeune [44] – "in a vertiginous manner to the essence of art: the auto-representation of [man and] mankind (and not of the [external] world)" (p. 73). These aspects of corporeal awareness and self-perception in self-portraits, in addition to mental imagery as mentioned above, have also led to the inclusion of more global and complex aspects of processing, related to one's body and self, such as personhood, personality or the painter's inner self in self-portraits [42]. Caspar David Friedrich said: "The painter should not just paint what he sees in front of him, but also what he sees within himself."[4] Thus, reduplication of body and self is present in self-portraits as well as autoscopic phenomena. In addition, autoscopic phenomena have not only been observed in neurological patients, but also, with similar characteristics, in healthy subjects [1, 8, 14, 17, 18]. Moreover, they are not rare but encountered in 10–20% of the healthy population [17, 18]. It has thus been suggested that autoscopic phenomena involve similar brain structures and functions in patients as well as healthy subjects [46]. As the analysis of the *verbal phenomenology* of autoscopic phenomena in neurological patients and healthy subjects has helped to define neurocognitive mechanisms of corporeal awareness and self-perception [10, 12–14, 16, 33, 46], I thought it worthwhile to examine whether similar or related mechanisms might also be detectable in the *pictorial phenomenology* of self-portraits. This might allow for the verification or falsification of proposed neurocognitive mechanisms of self-perception in autoscopic phenomena, but might also lead to a new avenue for the understanding, in art historical terms, of a given artist or the genre of self-portraiture. Before describing some of the characteristics of AH self-portraits, OBE self-portraits, and heautoscopy self-portraits, I would like to underline that the present study will not discuss style elements of a painter per se such as brush stroke, choice of colour, rendering of contours, which allow the connoisseur to judge whether a given painting has been executed by a certain painter. Instead, the present article will concentrate on the exploration of the visual, spatial and bodily mechanisms that might be present in the pictorial phenomenology of AH self-portraits, OBE self-portraits and heautoscopy self-portraits respectively as discussed above.

1 Of course the painter could use other means to draw his image such as a photo or another painting of himself

2 "Schliesse dein leibliches Auge, damit du mit dem geistigen Auge zuerst siehst dein Bild. Dann fördere zutage, was du im Dunkeln gesehen, dass es zurückwirke auf Andere von aussen nach innen." (quoted from Hoffmann [41], p. 12, translation O. B.)

3 "Dans le miroir qui lui fait face le peintre s'est vu devenu modèle." (quoted from Bonafoux [42], p. 37, translation O. B.)

4 "Der Maler soll nicht bloss malen, was er vor sich sieht, sondern auch, was er in sich sieht." (quoted after Jensen [45], translation O. B.)

Figure 2 Autoscopic hallucination self-portraits.

A Giorgione: "Self-portrait as David" (1500, Braunschweig)

B Dürer: "Self-portrait with landscape" (1498, Madrid)

C Rembrandt: "Self-portrait" (1632, Glasgow)

D Rembrandt: "Self-portrait" (1669, London)

E Titian: "Self-portrait" (1560)

Self-portraiture and autoscopic hallucinations

There are only few examples of self-portraits prior to the Renaissance although since then the number of self-portraits has steadily risen. Whereas many Quattrocento artists often added or hid their image in group paintings [47, 48], single-figure self-portraits began to appear around 1500. This can be seen in self-portraits by Giorgione (1477–1519; "Self-portrait as David", 1500, Braunschweig; fig. 2A), Perugino (1450–1523; "Self-portrait", 1496, Perugia) and Albrecht Dürer (1471–1528; "Self-portrait with landscape", 1498, Madrid; fig. 2B). The latter has painted a series of at least seven self-portraits depicting himself from boy to young man (fig. 2B) to older man. Thus, when Bell [48] discusses "Dürer's pictorial discovery of the modern self" (p. 9), Dürer is generally thought of as the first artist to have drawn a series of self-portraits for himself as well as the public. Only a century and a half later, in 1664, Leopoldo De Medici of Florence started the first collection of self-portraits. His nephew, the grand duc Cosimo III (who inherited the over 80 self-portraits collected by his uncle), continued this tradition and exposed them in the Uffici, where today a much enlarged collection with over one thousand self-portraits can be seen.

I would like to argue that most of the self-portraits that can be seen in the Uffici and museums throughout the world represent the characteristics of autoscopic hallucination, whereas characteristics of heautoscopy and out-of-body experience are less frequently found. Importantly, portraits that artists draw of themselves and that reflect characteristics of autoscopic hallucination do not differ much from portraits that artists have drawn of other people and it may be difficult, even for the connoisseur, to differentiate self-portraits from portraits of others [39, 42]. Tschaikowskaja [40] even remarked that the painter draws himself as if he would see himself in the mirror as somebody else. Karl Marx said that "[…] humans first mirror themselves in

other people. Only through the relationship with the human being Paul as a conspecific, will the human being Peter refer to himself as a human being" (quoted after [40], p. 359). This has also been observed by Pächt [49] who with regard to Rembrandt's self-portraits states that it seems as if the artist has almost painted these self-portraits as if drawing not himself but a double: "In Rembrandt's early self-portraits […] one is tempted not to take subject and object as identical and also here to characterise the picture as […] if Rembrandt would have not portrayed himself but a Doppelgänger."[5] Thus, nothing in Rembrandt's "Self-portrait" from Glasgow (1632; fig. 2C) could tell the beholder that the artist himself has drawn a picture of himself. The concentration upon the (visual) mirror image in some of these AH self-portraits is sometimes so intensive that there might be right-left reversals with respect to facial features (i.e. van Gogh's cut ear) or hands (right-handed painters may draw themselves as left-handed; e.g. Lovis Corinth [39]). With respect to the present discussion of self-portraits, these instances of right-left reversals in self-portraits present evidence not only for the painter's concentration on the visual reflection in the mirror, but also highlight that the reflection is seen as another person, as an image, disconnected from the painter. Interestingly, mirror reversals have also been observed in subjects with autoscopic hallucination [14, 25] and are especially frequent in autoscopic hallucination if compared with heautoscopy and out-of-body experiences. In the "Self-portrait" (from Glasgow) Rembrandt focuses on the upper parts of his body. This concentration on the upper body and especially the face in the portraiture of others and oneself can also be seen in the special emphasis that artists have given to facial expression, eye and head position. These visual characteristics also appear in Rembrandt's "Self-portrait" from London that was drawn 37 years later (1669; fig. 2D). In fact, the majority of self-portraits show these elements [47, 48]. The depicted upper body is shown in front-view, with eyes looking at the beholder, giving the impression of being a portrait of another person rather than of the artist himself. Note also that based on these characteristics it seems as if the painted person is located in close proximity to the contemplator of the painting. Although Titian (1485–1576) also depicts the arms and parts of the trunk in his "Self-portrait" (1560; fig. 2E), the above-mentioned characteristics of AH self-portraits are present. Similar observations can be made in Edgar Degas's (1834–1917) "Self-portrait" (1857, Wiliamstown), Piet Mondrian's (1872–1944) "Self-portrait" (1917, The Hague), Paul Klee's (1879–1940) "Lost in Thought" (1919, Pasadena), as well as in Jean Dubuffet's (1901–1985) "Self-portrait II" (1966, Paris), Francis Bacon's (1909–1992) "Self-portrait" (1969, private collection) and in the large majority of Vincent van Gogh's self-portraits.

In summary and with respect to self and body processing, I would like to suggest that these visual characteristics of the AH self-portrait render the spatial location of the painter's self unambiguous. The reduplicative nature of the self that characterises all self-portraits as stated above – consisting of the painting self (in front of the canvas) and the painted self (on the canvas) – is disambiguated in AH self-portraits by the above-mentioned mainly visual characteristics: the painting self is located in front of the canvas and paints his double quite in the same way as he paints portraits of other people. This also applies to the self in autoscopic hallucination that is experienced as if looking from the habitual body position at the double in extracorporeal space (without disembodiment). This suggests that in AH self-portraits the reduplicated self, so characteristic of self-portraits, is only implicitly drawn. Visual characteristics predominate in AH self-portraits when compared to visuo-spatial characteristics or more explicit characteristics of body and self processing that are mainly found in the other forms of self-portraits, i.e. OBE self-portraits and heautoscopy self-portraits. These visual characteristics in AH self-portraits are sometimes so predominant that the painter paints himself mirror-inverted in order to draw the visual aspects of his body as precisely as he can. These mainly visual characteristics in AH self-portraits were approximated by what Cardinal Paleotti (Bishop of Bologna) in 1582 described about the way painters should paint sacred and profane images: "The task of the painter is to imitate the things in their natural state and to imitate them only as they showed themselves to the eyes of mortal human beings, without surpassing these limits"[6]. In the following two sections we will see how painters have tried to surpass these visual "limits" in self-portraiture.

5 "Wenn in Rembrandts frühen Selbstbildnissen zwischen Maler und Dargestelltem eine solche Distanz zu liegen scheint, dass man dazu geneigt ist, Subjekt und Objekt der Darstellung nicht für identisch zu halten und auch hier das Bild als einen Fremdbericht zu charakterisieren – als ob Rembrandt nicht sich selbst sondern gleichsam einen Doppelgänger porträtiert hätte." (quoted after Pächt [49], p. 67, translation O. B.)

6 "[...] l'office du peintre étant d'imiter les choses dans leur être naturel et seulement, telles qu'elles se sont montrées aux yeux des mortels, il n'a pas à franchir ces limites." (quoted after Bonafoux [42], p. 25, translation O. B.)

Figure 3 Out-of-body experience self-portraits.

A

B

C

D

A Rembrandt: "The artist in his studio" (1629, Boston)

B Tommaso Minardi: "Self-portrait" (1813, Florence)

C Velázquez: "Las Meninas" (1656, Madrid)

D Vermeer: "The artist's studio" (1666/67, Vienna)

Self-portraiture and out-of-body experience

Are there self-portraits that are characterised by elevated and distanced visuo-spatial perspective (or third-person perspective) as well as disembodiment as described for out-of-body experiences? Although both characteristics have been used less frequently in self-portraits than the characteristics described for AH self-portraits, I propose that several artists have applied characteristics of out-of-body experiences in their self-portraits. Thus, with respect to the distanced third-person perspective upon one's own body, a self-portrait by Rembrandt portrays the artist himself in his studio, from a distance of several meters, as standing in front of a canvas ("The artist in his studio", 1629, Boston; fig. 3A compare with fig. 2C, 2D). There are further differences with respect to AH self-portraits. In AH self-portraits Rembrandt painted only the upper part of his body and positioned his body closely to the canvas; not so in "The artist in his studio". Here, Rembrandt painted his entire body and drew it in a way that it only occupies a small part of the painting. The picture concentrates more on the entire spatial scene, of which Rembrandt's own body is only one element among others, such as the walls of the room, the canvas and further elements from the artist's studio. This contrasts with his AH self-portraits, where he gives much detail to his facial features that fill up most of the canvas. The implicitly sitting Rembrandt (fig. 2C, 2D) is replaced by an explicitly standing Rembrandt (fig. 3A). These characteristics can also be seen in Tommaso Minardi's (1787–1871) "Self-portrait" (1813, Florence; fig. 3B). In addition, the latter self-portrait is drawn not just from a distance, but also from an elevated visuo-spatial perspective. Although I cannot exclude that both latter OBE self-portraits were done by inspection via a mirror, they impress the beholder in quite a different way

than AH self-portraits, which are close-ups concentrating on facial features that are painted as if seen in a mirror. These scenic views of the artist in his studio surrounded by his paintings and painting utensils suggest that OBE self-portraits are primarily related to visuo-spatial imagery and not visual depiction of a reflected mirror image. These notions are also reflected in the experiences of subjects with autoscopic hallucination and out-of-body experiences. Subjects that experience autoscopic hallucinations are frequently preoccupied with the physical resemblance between their autoscopic double and themselves, whereas subjects with out-of-body experiences are generally more intrigued by their disembodiment and their astonishing surrounding view from their elevated perspective that also includes, among other things, their own body.

These characteristics are also present in the well-known painting "Las Meninas" (1656, Madrid; fig. 3C) by Velázquez (1599–1660). Here, eleven persons are depicted in a spacious room with many paintings on the walls. Velázquez paints himself as painting, standing in front of a huge canvas (indeed "Las Meninas" measures more than 10 feet). I should also briefly mention Velázquez' masterly play with the mirror in the back of the painting where a reflection of the King and Queen of Spain can be seen whom he should actually be in the process of portraying [42, 50, 51]. The result is a portrait of the young princess Margarita who is shown in the centre of the painting. Most important for the present speculations is that by inverting the visuo-spatial perspective and thus imagining seeing the entire scene from the position and visuo-spatial perspective of the King and Queen, Velázquez turns the portrait of the emperors and their daughter into a portrait of himself.[7] Again I speculate that "Las Maninas" was drawn primarily without the help of a mirror, but by mental imagery and from a distanced third-person and mentally disembodied visuo-spatial perspective. Whereas in the aforementioned OBE self-portraits mirror use cannot be excluded and is even suggested by the fact that the artist drew his own body in front-view, there are many examples of "the artist in his studio" paintings, in which the painter has depicted himself from behind (or in back-view). Thus, in Vermeer's (1632–1675; fig. 3D) "The artist's studio" (1666/67, Vienna) a distanced visuo-spatial perspective, a depiction of the artist's body in back-view, the canvas, as well as a larger spatial scene can be seen. This picture is difficult to paint by the use of a single mirror. This imposed visuo-spatial perspective is so beautifully drawn that the beholder or the artist himself can almost be sensed as if present in the picture, as standing behind the artist and as pulling the left curtain to the side [50, 51]. Wollheim [51] also noted that the visuo-spatial perspective is somewhat elevated as is typical for the out-of-body experience.

Distanced and elevated visuo-spatial perspective is one of the hallmarks of the painter Caspar David Friedrich (1774–1840), the famous painter of German Romanticism. In contrast to the aforementioned painters, Friedrich did not frequently depict his studio, but mainly painted landscapes. When discussing Friedrich's landscape paintings Rosen and Zerner [52] write that "in [his paintings such as "Der Morgen im Gebirge", St Petersburg, 1822/23; fig. 4A] an essential part of the[ir] effect comes from the *perspective* which seems to place the spectator in mid-air before the scene" [p. 12]. This elevated perspective and verticality is systematically increased throughout Friedrich's oevre [41] leading to such vertiginous masterpieces as the "Large Enclosure near Dresden" (1835, Dresden; fig. 4B). Here, the beholder is insecure about whether "we see the landscape from close by or far away" and we do not know whether "we stand on a bridge or whether we float with the painter in a balloon above the scene" ([41], p. 236–7). Rosen and Zerner [52] agree and even write that in the "Large Enclosure near Dresden" "the point of view of the observer is from far above so that the body of water seems to have a gentle curve as if it were the curvature of the earth […]" (p. 13). The extreme elevation and distance of the observer is further enhanced by another typical element that began to appear in Friedrich's paintings in 1810: the figure in back-view. These back-figures are in the large majority standing and most often placed in the picture's foreground (fig. 4C) [45].[8] Thus, observer and painter have the same body posture and orien-

7 Velázquez masterly plays and inverts a theme that had been introduced into portraiture by Jan van Eyck in his "Portrait of the Arnolfi Marriage". In this latter painting van Eyck had included his miniature self-portrait in a mirror in the back of the painting. By inverting the visuo-spatial perspective, Velázquez draws and imagines himself, the princess Margarita and the rest of the visuo-spatial scene from the position and visuo-spatial perspective of the Spanish King and Queen. Both royals are "only" depicted as small reflections in the mirror in the back of the room (corresponding to the position of van Eyck's 200 years earlier), whereas he paints himself large and in the foreground of the painting!

8 Several authors have argued that Friedrich used these back-figures because he had difficulties drawing human figures (i.e. Jensen [45]). Yet, this argument is not very convincing because of their important and adequate role in Friedrich's art (see Wollheim [51] for another argument). And in fact, Friedrich was an excellent portrait painter as shown by the few portraits that he executed for his family and friends (Hoffmann [41]).

Figure 4 This figure assembles several OBE self-portraits by Caspar David Friedrich that reflect a distanced elevated perspective as well as reduplication with autoscopy.

A

B

C

D

A "Der Morgen im Gebirge" (1822/23, St Petersburg)

B "Large Enclosure near Dresden" (1835, Dresden)

C "Abendlandschaft mit zwei Männern" (1830–1835, St Petersburg)

D "Der Wanderer über dem Felsenmeer" (1818, Hamburg)

tation as the back-figures. This mechanism might facilitate the identification with the double as already noticed in 1810 by Heinrich von Kleist (quoted after [45]) and as probably intended by Friedrich (see also [45, 51]). Thus, Friedrich's self-identification with the back-figure, in my opinion, allows the designation of these paintings as self-portraits. He depicts himself as looking into the landscape or visual scene and includes his own double seen from behind (autoscopy). These visuo-spatial OBE-characteristics are elaborated and intensified in "Der Wanderer über dem Nebelmeer" (1818, Hamburg; fig. 4D). Here, the painter's double is placed in the centre of the painting's foreground on the top of a mountain that overlooks a deep valley and other mountains in the distance. The reduplicative character of the back-figures is made even more explicit in several paintings in which Friedrich not only used one double but two identical back-figures (e.g. "Abendlandschaft mit zwei Männern", 1830–1835, St Petersburg). Adding to their reduplicative character, Friedrich generally positioned the two back-figures next to each other as well as in the same standing posture and body orientation and often called them brothers or twins. Although disembodiment is not explicitly conveyed in Friedrich's paintings, Rosen and Zerner [52] remarked that "the sense of being suspended in space" as well as "detached and poised over emptiness […]" (p. 13) is an essential feature of Friedrich and other Romantic painters. It is this suspension and detachment of the artist's body above the visual scene that is so characteristic of the out-of-body experience.

Figure 5 Heautoscopy self-portraits.

A

B

C

D

E

A William Orpen: "Myself and Venus" (1908, Pittsburgh)

B Giovanni Battista Paggi: "Self-portrait in the studio with an architect friend" (1580–1590, Würzburg)

C Gustave Courbet: "Self-portrait: the desperate man" (1841, private collection)

D Johannes Gumpp: "Self-portrait" (1646, Florence)

E Francisco Goya: "Self-portrait in the studio" (1791/92, Madrid)

In summary, I would like to suggest that the visuo-spatial characteristics of OBE self-portraits impose upon the beholder the distanced and imaginary visuo-spatial position and perspective of the painter's self. The reduplicative nature of the self in OBE self-portraits is explicitly drawn as the body-self is painted and/or intended twice in these paintings. Thus, the body (or the painted painter) is localised in the back-figures as in Friedrich and Vermeer or in the front-figures as described for Rembrandt and Velázquez. Secondly, I suggest that the location of the disembodied self (the painting or observing painter) is intended at an elevated and distanced position within the painting. It is from this position that the artist observes the spatial scene including his own body (as back-figure or front-figure) below. Based on this explicit reduplication, OBE self-portraits might be grouped with double self-portraits (see below), although the artist's body is only painted once. Vestibular and spatial characteristics thus seem to predominate in the OBE self-portraits, when compared to the visual characteristics of AH self-portraits. In the following section I will present some of the characteristics of heautoscopy self-portraits.

Self-portraiture and heautoscopy

Next to the visual AH self-portraits and the spatial OBE self-portraits, there is a third class of self-portraits (heautoscopy self-portraits) which mainly reflect the reduplicated body of the artist as well as the process of painting itself in a very explicit manner. As described above patients with heautoscopy have difficulty deciding as to where they are and where their self is localised. In the autoscopic body or in their physical body? Furthermore, there are many reports of heautoscopy patients about the sharing of actions and thoughts between self and double that are not present in AH or OBE patients [16, 20, 25]. By making explicit reference to the use of a mirror and the drawing process itself, the painters of heautoscopy self-portraits try to recreate these two instabilities in their self-portraits. Heautoscopy self-portraits often raise the question in the beholder whether the location of the painter's self is on the canvas (and thus painted) or in front of the canvas (and thus painting). This search may also be described by reference to the painter's gaze that searches in an alternating fashion between the self in the mirror

and the one on the canvas: "The painter's gaze passes from mirror to canvas, 'du pareil au même', from the image that gives itself to the eye to the image that is created, trace by trace, stroke by stroke"[9]. Stressing the fascinating difficulty of this process, Derrida [53] writes about the fragile process of painting a (heautoscopy) self-portrait: "to see oneself looking, the painter loses sight of himself at the moment when the drawing tries desperately to seize himself."[10]

First I will describe the explicit use of mirrors in heautoscopy self-portraits in order to highlight the painting process and the painter's body. Artists have integrated the mirror in a number of different ways into self-portraits. They may overtly express that the picture and thus the painter himself has been drawn while looking into the mirror (which has also been depicted in the painting). This introduces ambiguity as to the exact whereabouts of the painter as it is not always immediately clear whether the reflection of the painter's body or the painter's actual body in front of the mirror is depicted. Thus, William Orpen ("Myself and Venus", 1908, Pittsburgh; fig. 5A) does not look directly at the beholder but via a reflection in a mirror. Explicit integration of the mirror into the self-portrait was used much earlier by Giovanni Battista Paggi in his "Self-portrait in the studio with an architect friend" (1580–1590, Würzburg; fig. 5B). He placed a "friend" between himself and the mirror. The decision on who is the painter is somewhat difficult as only the reflected hand of the painter tells the beholder where the painter is. Gustave Courbet (1819–1877) has not drawn the mirror in his famous "Self-portrait: the desperate man" (1841, private collection; fig. 5C). Yet, it is almost as if the surface of the canvas itself is the surface of the mirror. This gives the impression that the painted painter looks at us and not that the observer (or the artist in front of the canvas) looks at the painted painter. The same use of a mirror (without visualisation of it) is present in an etching by Rembrandt ("Self-portrait", 1648). As Pächt [49] writes with regard to this heautoscopy self-portrait: "This look dematerialises the painted person, thus also the self in the self-portrait: this new, explicit and dematerialising style of painting, by which one perceives more strongly the process of painting than the painting itself, seems to be the technical secret behind this radical introversion of this self-portrait."[11] By the use of two mirrors while painting his self-portrait Lovis Corinth (1858–1925) painted a double self-portrait consisting of his (reflected) body as well as a reflection of his (reflected) body ("Letztes Selbstportrait", 1925, Zürich). The explicit mirror use in these self-portraits stresses the reduplication of the artist's body-self in self-portraiture. This is even more apparent in so-called triple self-portraits. Thus, Johannes Gumpp ("Self-portrait", 1646, Florence; fig. 5D) and Norman Rockwell ("Triple self-portrait", 1960, Stockbridge) depicted themselves three times in a single self-portrait. The painter is seen in back-view while painting in both pictures. Whereas all three self-depictions – mirror image, painter and drawn image – are clearly separable in Rockwell's painting, the mirror image is difficult to differentiate from the drawn image in Gumpp's triple self-portrait. Rockwell also posted self-portraits of Dürer, Rembrandt, van Gogh, as well as other previously drawn self-portraits of himself on his canvas adding to the multidimensional reduplication in this triple self-portrait. Rockwell also highlights that the use of a mirror in self-portraits is not just a visual process related to copying of what the eye sees. Whereas his eyes are open on the canvas (without glasses), "he" is wearing shaded glasses in the mirror image.

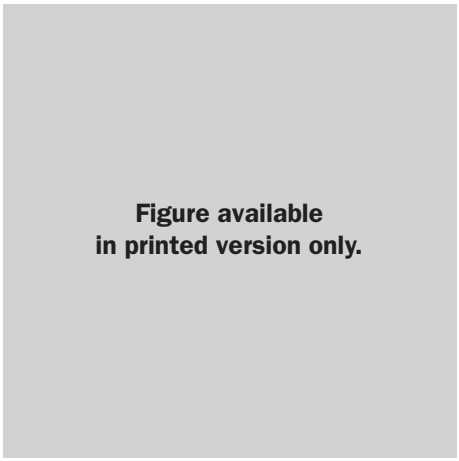
Often when artists depict themselves as reflected in a mirror they also showed themselves in the process of painting or as being active in their studios. This depiction of the artist at work seems to be a direct statement by the painter about the art of painting as well as his person as an artist carrying out intentional pictorial acts. This is the second main mechanisms in heautoscopy self-portraits. Thus, the artist may depict himself while he is drawing his portrait emphasising that he is the author of the portrait that is in front of the beholder. As mentioned above, if the painter draws himself while he is in the process of painting, it may not be entirely unambiguous whether the depicted person is painting or being painted as in Francisco Goya's "Self-portrait in the studio" (1791/92, Madrid; fig. 5E). This instability of the self (or of self-location) is also present in a similar self-portrait by Alberto Giacometti (1901–1966; "Self-portrait", 1921, Zurich) and has also been observed in some of Rembrandt's self-portraits. Thus, Pächt [49] writes that in Rembrandt's later work, "the

9 "[Le] regard du peintre qui passe du miroir à la toile, du pareil au même, de l'image qui se donne à celle qui s'élabore, trait pour trait, touche après touche." (quoted after Bonafoux [42], p. 22, translation O. B.)

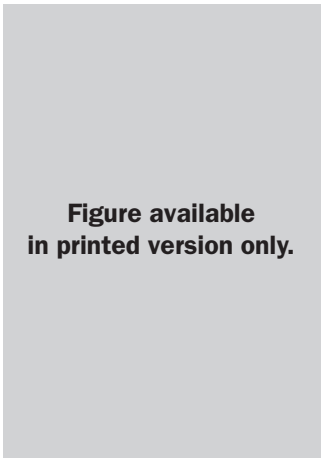
10 "A se regarder voir, il se voit aussi bien disparaître au moment ou le dessin tente désespérément de le ressaisir." (quoted from Derrida [53], p. 61, translation O. B.)

11 "Dieser Blick entgegenständlicht das Gemalte, also auch das Selbst im Selbstportrait: die neue offene entgegenständlichte Malweise, bei der man stärker das Malen als das Gemalte empfindet, ist wohl das technische Geheimnis, das hinter dieser radikalen Introvertierung des Selbstbildnisses steht." (quoted from Pächt [49], p. 76–7, translation O. B.)

Figure 6 This figure assembles heautoscopy self-portraits, this time double self-portraits, by Frieda Kahlo and Egon Schiele.



A



B

C

D

E

A Frida Kahlo:
"The two Fridas"
(1939, Mexico-City)

B Frida Kahlo:
"Tree of hope remain strong"
(1946, private collection)

C Egon Schiele:
"The truth was unveiled"
(1913, private collection)

D Egon Schiele:
"Self-seers II"
(1911, Vienna)

E Egon Schiele:
"Prophets"
(1911, Stuttgart)

self-portraits become more numerous in which the artist is shown at work, equipped with palette and brush and sometimes even in front of the easel […]. Especially here the impression is more one of a holding in manual work and a kind of totally losing one's self while looking or observing [… leading to a] kind of splitting of consciousness between external act [painting] and attention [looking, observing], as if Rembrandt had forgotten to continue painting while looking."[12]

Splitting of consciousness and instability of the self are often experienced by heautoscopy patients, who experience the self to be localised in alternation or simultaneously between autoscopic and physical body [16]. This often leads to the experience of bilocation of the self where heautoscopy patients have the impression of being localised at two places at the same time and thus having two separate bodies. Astonishingly, this explicit reduplication of the self as reflected in the experience

12 "In den Selbstbildnissen der Spätzeit mehren sich die Fälle, in denen der Künstler bei der Arbeit gezeigt wird, mit Palette und Pinsel ausgestattet und manchmal sogar vor der Staffelei, wie in dem 1660 datierten Bild des Louvre. Gerade hier ist der Eindruck mehr der eines Innehaltens in der manuellen Arbeit und Sich-ganz-im-Schauen-Verlierens – eine typisch holländische Lösung des Problems des Selbstbildnisses insofern, als eine Art Bewusstseinsspaltung zwischen äusserem Tun [Malen] und Aufmerksamkeit [Sehen, Beobachten] festgehalten ist: als ob Rembrandt über dem Schauen das Malen vergessen hätte." (quoted from Pächt [49], p. 77, translation O. B.)

of bilocation has also been depicted in self-portraits. I suggest that (at least) three 20th-century artists have applied the concept of bilocation in their self-portraits without pictorial reference to a mirror: Giorgio de Chirico (1888–1978), Frieda Kahlo (1907–1957) and Egon Schiele (1890–1918). Thus, in de Chirico's "Self-portrait with shadow" (1920) the artist paints himself as looking to the left whereas a translucent shadow-like double of himself is looking towards the right. Both bodies are drawn back to back. In "Double Self-portrait" (1920, Toledo) the artist is shown facing a double of himself in the form of a sculpture. Although the reduplication of the self is explicitly expressed, the location of the artist is unambiguous in both paintings. This identification of the painting self is impossible in two double self-portraits by Kahlo. In "The two Fridas" (1939, Mexico-City; fig. 6A) two alter egos can be seen holding hands and both looking at the observer. One is wearing a classical Mexican Tehuana-dress, the other a more European dress reflecting two sides of Frida Kahlo. In "Tree of hope remain strong" (1946, private collection; fig. 6B) one body represents Kahlo just after having had an operation on her dorsal column and lying on her side on the bed facing away from the observer, whereas the other Kahlo is sitting on the bed, representing her hopes that this operation will relieve her suffering. What is important with respect to autoscopic phenomena and bilocation in these two paintings is the impossibility to decide who is Frida Kahlo and who is the double.

Another painter who also drew not only numerous single self-portraits but also double self-portraits was Egon Schiele. Schiele drew the double's and the painter's body frequently in a comparable and realistic manner. Like Kahlo, Schiele often painted the doubles in similar body postures and often as looking at the beholder [54, 55]. In an even more striking example, in "The truth was unveiled" (1913, private collection; fig. 6C) Schiele drew a double (in orange) that is shown as coming out of (or entering) his own body's back (in brown) stressing the physical connection between both bodies. It is impossible to say which body belongs to Egon Schiele and where the painter's self or centre of awareness is localised. In another double self-portrait, the "Self-seers II" (also called "Death and Man"; 1911, Vienna; fig. 6D), a translucent Egon Schiele is drawn behind a darkly dressed Egon Schiele in the foreground. Schröder has suggested that this picture might show that "the disembodied, translucent, dead artist embraces the living man [Schiele] from behind. The artist is his own shadow" ([54], p. 58). Yet, again, I think one cannot affirm whether the double is the back- or front-figure or whether the depicted hands and arms belong to the double or to Schiele's body. Interestingly, both bodies are depicted with closed eyes (or actually without eyes) suggesting that Schiele stresses the nonvisual character of these own body depictions. Translucency of the double has also been used by de Chirico in his double "Self-portrait with shadow" and is often described by subjects with heautoscopy [10, 16]. Finally, it was stated that in "Prophets" (double self-portrait; 1911, Stuttgart; fig. 6E) "[…] the artist conducts a disturbing dialogue with his other self" ([54], p. 58). Again the eyes of the doubles are either closed, not drawn at all, almost enucleated or only slightly opened, probably reflecting Schiele's intention to present the felt self and not the seen self. As written by Kalir [55] Schiele explored the self in this group of allegorical canvases called the Self-seers series in which "all paintings […] are self-portraits, and most contain at least two images of Schiele: a primary living body and a ghostly duplicate" (p. 118). The doubles in Schiele's double self-portraits have been described as muse-like, who manipulate the artist from behind, or as an inspirational emissary from the beyond, a malevolent aspect or "Schiele's inner directed search for self" (p. 122).

In summary, I would like to suggest that the complex somatosensory and motor characteristics of heautoscopy self-portraits highlight the process of painting itself as a voluntary act, an art and the painter's search for his self (or his selves). The reduplicative nature of the self in heautoscopy self-portraits is explicitly drawn because the self is drawn twice. In addition, an essential characteristic of a full-blown heautoscopy self-portrait is that it is often difficult to decide, especially in the paintings by Egon Schiele and Frida Kahlo, who is the double and who is the painter. The painting self is thus not located in front of the canvas any more (as in AH self-portraits), but seems to have disappeared together with the painted painter into the canvas as in OBE self-portraits. Yet, whereas in the latter form of self-portraits the location and visuo-spatial perspective of the observing self is clearly defined, this is not the case in heautoscopy self-portraits where the self is bilocated and present within both depicted bodies. The painter has left the physical world and has migrated and dissolved into the world of painting and art. Motor and somatosensory characteristics seem to predominate in heautoscopy self-portraits, compared to the visual characteristics of AH self-portraits, and spatial and vestibular characteristics of OBE self-portraits.

Conclusions

Critchley [39] "wonder[ed] what could be the reason why so many artists depicted themselves upon the canvas" and why to "some this was an occasional happening [such as Monet or Tintoretto], while others […] painted themselves year after year throughout their professional career" (p. 121). Although any satisfying answer to this question goes beyond the scope of the present article, many answers have been proposed in the past. One obvious answer would be that the penurious artist is frequently painting self-portraits, because he can then "dispense with the assistance of a paid model, expensive perhaps but not always available" [39, 56]. In addition, the artist him- or herself is also the most practical model, as s/he is always at hand. Yet, both authors stated that there are many other (non-aesthetic) reasons for drawing one's self-portrait. This includes allowing the artist to show his or her skill (i.e. potential clients could compare original and portrayed painter), boasting the artist's status, emulating their admired masters, publicising one's artistic beliefs or narcissism [56]. Along more aesthetic lines and as many others, Bell [48] has argued that self-portraits or self-portraiture is a more private, "a singular, in-turned art […] at the edge between seer and seen" (p. 5) allowing the pictorial discovery of the self. The present article has tried to extend this last dimension by showing how self-portraiture might be linked with the field of cognitive neuroscience of corporeal awareness [39] as well as self-perception and self-experience. This was highlighted by showing that the neurocognitive mechanisms of the three forms of illusory reduplication, i.e. autoscopic hallucination, heautoscopy and out-of-body experience (which were based on verbal phenomenology), can be used to differentiate between self-portraits according to similar mechanisms (which are based on pictorial phenomenology).

To conclude, one might say that autoscopic hallucinations and AH self-portraits reflect that the self perceives its body from the outside and as a mainly visual body. The reduplicative character of the double is only implicitly present and the mechanisms of "seeing" predominate over spatial and body-perceptual mechanisms. The self "sees" its body as the body of somebody else. Out-of-body experiences and OBE self-portraits also reflect the self perceiving its body from the outside, but not only as a visual body but as a body in a complex spatial scene of which the body is only a part. The reduplicative character of the double is explicit and the painter's self is distanced and elevated from its body. The self is "out of touch" with its somatosensory perceptions [57] and "sees" its body with the eyes of somebody else. Finally, heautoscopy and heautoscopy self-portraits reflect the perception of the body from the inside via somatosensory and motor mechanisms. The self is in touch not only with her or his bodily feelings but also with the bodily feelings of the double. The self does not "see" but mainly "feels" its body and the body of the double to be the same body.

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References

1 Menninger-Lerchenthal E. Das Truggebilde der eigenen Gestalt. Berlin: Karger; 1935.

2 Lhermitte J. L'image de notre corps. Paris: Editions de la Nouvelle Revue Critique; 1939. p. 170–227.

3 Critchley M. The body image in neurology. Lancet 1951;258:335–40.

4 Hécaen H. Les asomatognosies. In: Hécaen H. Introduction à la neuropsychologie. Paris: Librairie Larousse; 1973. p. 273–96.

5 Landis T. The neuropsychology of the body image. In: Guimon J, editor. The Body in Psychotherapy. Basel: Karger; 1997. S. 19–24.

6 Ramachandran VS, Hirstein W. The perception of phantom limbs. Brain 1998;121:1603–30.

7 Brugger P. Supernumerary phantoms: a comment on Grossi, et al.'s (2002) spare thoughts on spare limbs. Percept Mot Skills 2003;97:3–10.

8 Hécaen H, Ajuriaguerra J. L'Héautoscopie. In: Méconnaissances et hallucinations corporelles. Paris: Masson; 1952. p. 310–43.

9 Lunn V. Autoscopic phenomena. Acta Psychiatr Scand 1970;46:118–25.

10 Brugger P, Regard M, Landis T. Illusory reduplication of one's own body: phenomenology and classification of autoscopic phenomena. Cogn Neuropsychiatry 1997;2:19–38.

11 Halligan PW. Phantom limbs: the body in mind. Cogn Neuropsychiatry 2002;7:251–68.

12 Devinsky O, Feldmann E, Burrowes K, Bromfield E. Autoscopic phenomena with seizures. Arch Neurol 1989;46:1080–8.

13 Grüsser OJ, Landis T. The splitting of "I" and "me": heautoscopy and related phenomena. In: Grüsser OJ, Landis T. Visual Agnosias and Other Disturbances of Visual Perception and Cognition. Amsterdam: MacMillan; 1991. p. 297–303.

14 Brugger P. Reflective mirrors: perspective taking in autoscopic phenomena. Cogn Neuropsychiatry 2002;7:179–94.

15 Blanke O, Ortigue S, Landis T, Seeck M. Stimulating illusory own-body perceptions. Nature 2002;419:269–70.

16 Blanke O, Landis T, Spinelli L, Seeck M. Out-of-body experience and autoscopy of neurological origin. Brain 2004;127:243–58.

17 Blackmore SJ. Beyond the Body. An Investigation of Out-of-Body Experiences. London: Heinemann; 1982.

18 Irwin HJ. Flight of Mind: A Psychological Study of the Out-of-Body Experience. Metuchen, NJ: Scarecrow Press; 1985.

19 Kölmel HW. Complex visual hallucinations in the hemianopic field. J Neurol Neurosurg Psychiatry 1985;48:29–38.

20 Brugger P, Agosti R, Regard M, Wieser HG, Landis T. Heautoscopy, epilepsy, and suicide. J Neurol Neurosurg Psychiatry 1994;57:838–9.

21 Féré C. Note sur les hallucinations autoscopiques ou spéculaires et sur les hallucinations altruistes. Comptes Rendues Hebdomedaires des Séances et Mémoirs de la Société de Biologie 1891;3:451–3.

22 Naudascher MG. Trois cas d'hallucinations spéculaires. Ann Médico-Psychol 1910;68:284–96.

23 Menninger-Lerchenthal E. Der eigene Doppelgänger. Bern: Huber; 1946.

24 Sollier P. Les phenomènes d'autoscopie. Paris: Félix Alcan; 1903.

25 Lukianowicz N. Autoscopic phenomena. Arch Neurol Psychiatr 1958;80:199–220.

26 Green CE. Out-of-Body Experiences. London: Hamish Hamilton; 1968.

27 Muldoon SJ, Carrington H. The Projection of the Astral Body. London: Rider; 1929.

28 Crookall R. More Astral Projections. Analyses of Case Histories. London: Aquarian Press; 1964.

29 Bonnier P. Le vertige. Paris: Masson; 1905.

30 Skworzoff K. Doppelgänger-Halluzinationen bei Kranken mit Funktionsstörungen des Labyrinths. Zeitschr Nervenheilk 1931;133:762–6.

31 Ehrenwald C. Anosognosie und Depersonalisation. Nervenarzt 1931;4:681–8.

32 Ionasescu V. Paroxysmal disorders of the body image in temporal lobe epilepsy. Acta Psychiatr Scand 1960;35:171–81.

33 Denning TR, Berrios GE. Autoscopic phenomena. Br J Psychiatry 1994;165:808–17.

34 Todd J, Dewhurst K. The double: its psycho-pathology and psychophysiology. J Nerv Ment Dis 1955;122:47–55.

35 Lippman CW. Hallucination of physical duality in migraine. J Nerv Ment Dis 1953;117:345–50.

36 Lhermitte J. Les phenomènes héautoscopiques, les hallucinations spéculaires. In: Lhermitte J. Les hallucinations. Clinique et physiopathologie. Paris: G. Doin; 1951. p. 124–68.

37 Zacks JM, Ollinger JM, Sheridan MA, Tversky B. A parametric study of mental spatial transformations of bodies. Neuroimage 2002;16:857–72.

38 Blanke O, Mohr C, Michel CM, Pascual-Leone A, Brugger P, Seeck M, et al. Linking out-of-body experience and self processing to mental own-body imagery at the temporo-parietal junction. J Neurosci 2005;25:550–7.

39 Critchley M. Ecce homo. Observations upon self-portraiture. In: Critchley M. The Divine Banquet of the Brain and Other Essays. New York: Raven Press; 1974.

40 Tschaikowskaja W. Die typologische Struktur des Doppelgängers in der Kunst. Kunst und Literatur 1982;30:354–63.

41 Hoffmann W. Caspar David Friedrich. München: Verlag C.H.Beck; 2000.

42 Bonafoux P. Moi! Autoportraits du XX^{e} Siècle. Milan: Skira Editore; 2004.

43 Parmentier M. Das gemalte Ich. Über die Selbstbilder von Rembrandt. Z Pädiatr 1998;43:721–37.

44 Lejeune P. Moi aussi. Paris: Collection Poetique; 1986.

45 Jensen JD. Caspar David Friedrich. Leben und Werk. Köln: Dumont Verlag; 1972.

46 Blanke O, Arzy S. Out-of-body experience, self processing, and the temporo-parietal junction. Neuroscientist 2005;11:16–24.

47 Goldscheider L. Fünfhundert Selbstporträts. Wien: Phaidon Verlag; 1936. S. 7–54.

48 Bell J. 500 Self-portraits. London: Phaidon Press; 2000. p. 5–10.

49 Pächt O. Das Selbstbildnis. In: Pächt O. Rembrandt. München: Prestel Verlag; 1991. S. 65–78.

50 Gombrich EH. Vision and Visions. Catholic Europe, first half of the seventeenth century. In: Gombrich EH. The Story of Art. London: Phaidon Press; 2000 [1950]. p. 387–411.

51 Wollheim R. Painting as an Art. Princeton: Princeton University Press; 1984.

52 Rosen C, Zerner H. What did the Romantics mean? N Y Review Books vol. 20, No. 17, 1st November 1973.

53 Derrida J. Mémoires d'aveugle. Paris: RMN; 1990.

54 Schröder KA. Egon Schiele. Eros and Passion. München: Prestel Verlag; 1999.

55 Kalir J. Egon Schiele. New York: Harry N. Abrams, Inc., Publishers; 1994.

56 Borzello F. Seeing Ourselves. Woman's self-portraits. London: Thames and Hudson; 2002.

57 Metzinger T. The prescientific concept of a "soul": a neurophenomenological hypothesis about its origin. In: Peschl MF, editor. Die Rolle der Seele in der Kognitionswissenschaft und der Neurowissenschaft. Auf der Suche nach dem Substrat der Seele. Würzburg: Königshausen & Neumann. p. 189–214 (in press).