

POLYOPIC HEAUTOSCOPY:
CASE REPORT AND REVIEW OF THE LITERATURE

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ABSTRACT

Heautoscopy, i.e., the encounter with one's double, is a multimodal illusory reduplication of one's own body and self. In its polyopic form, more than one double is experienced. In the present article, we review fourteen published cases of polyopic heautoscopy and describe in detail the case of a 41-year-old man with polyopic heautoscopy resulting from a tumor in the insular region of the left temporal lobe. Our case is illustrative in several respects: (1) The patient's five doubles were all confined to the right hemispace. Laterality in this case is discussed with reference to previous cases of unilateral heautoscopy after focal brain damage, which generally do not show a hemispatial or hemispheric bias. (2) The patient's psychological affinity with his doubles, and also the extent of their echopraxia of his movements, decreased as a function of their perceived spatial distance from the patient's body, corroborating previous observations of associations between spatial and psychological phenomenologies during autoscopic phenomena. (3) While classical heautoscopy (the reduplication of a single body and self) is considered a breakdown in the integrative processes that enable us to identify our self with our body, the phenomenon of polyopic heautoscopy (a *multiplication* of body and self) points to the multiple mappings of the body, whose disintegration may give rise to the illusory experience of multiple selves.

Key words: autoscopic phenomena/*doppelgänger*, polyopsy/polyopia, unilateral hallucinations, body schema, reduplication, self

INTRODUCTION

Autoscopic hallucinations and heautoscopy are two variants of a reduplication of one's own body and self (Blanke et al., 2004; Bradford, 2005; Brugger et al., 1997). In the former, an exact mirror image of oneself, occasionally only of one's face or bust, is perceived visually (Maillard et al., 2004; Zamboni et al., 2005). Such hallucinations are usually of very brief duration and often accompanied by other types of visual hallucinations or illusions. In the latter variant, i.e. heautoscopy proper, a person is confronted with his or her double, or *doppelgänger*, which may or may not mirror the person's appearance. Regardless of its visual features, the hallucinatory figure is *felt* to be a double of one's self. The feeling of belonging toward one's double is usually accompanied by alterations in bodily awareness; for example, the person feels an unusual lightness of the body, experiences vestibular illusions, or describes a feeling of detachment. Frequently, heautoscopy echopraxia, i.e., the imitation of bodily movements by the double, gives rise to the illusion that it is the *doppelgänger* that "contains the real mind" (e.g., Lukianowicz, 1958, cases A and D; Dewhurst and Pearson, 1955, cases 1 and 2; Brugger et al., 1994). Echopractic movements may sometimes follow actual body movements with a time lag (e.g., Lance, 1976), an observation also reported in patients with supernumerary phantom limbs (Hari

et al., 1998) and supporting the notion of the *doppelgänger* as a "phantom of the entire body" (Brugger, 2006). There is considerable variation in the reported duration of heautoscopy; it may last for seconds or for hours, and even cases of the double as a steady companion are not exceptional (Conrad, 1953; Engerth and Hoff, 1929; Pearson and Dewhurst, 1954). Heautoscopy has been described in a broad range of neurological disorders such as epilepsy, migraine, neoplasia, infarction, and infection (Menninger-Lerchenthal, 1935, 1946; Lippman, 1953; Devinsky et al., 1989; Dening and Berrios, 1994; Brugger et al., 1997), and also in psychiatric disorders such as schizophrenia, depression, anxiety, and dissociative disorders (Bychowski, 1943; Carp, 1952; Todd and Dewhurst, 1955; Lukianowicz, 1958; Damas Mora et al., 1980; Dening and Berrios, 1994). Based on an analysis of autoscopic phenomena after focal brain lesions, Blanke et al. (2002, 2004) emphasized the specific importance of lesions at the temporo-occipito-parietal junction. While autoscopic hallucinations have almost exclusively been reported in neuropsychiatric patients, heautoscopy also occurs in the healthy population, especially in the framework of a preoccupation with one's own self and its place in the world or as a pathological grief reaction (Menninger-Lerchenthal, 1935; Hécaen and de Ajuriaguerra, 1952; Wells, 1983; Dening and Berrios, 1994).

Among both types of autoscopic phenomena,

TABLE I
 Characteristics of 14 published cases of polyopic autoscopic phenomena

Case #	Source (chronological order)	Patient (sex, age)	Etiology	Key contents of autoscopic experience
1.	Staudenmaier (1912/1968)	Male, n.r.	Schizophrenia (Ahlenstiel, 1949)	Patient sees 3 identical doubles in front of himself. "They stood still whenever I stood still, lifted their arms whenever I did"
2.	Storch (1924)	Female, 34	Schizophrenia	Patient sees "seven forms coming out of me, one after the other [...]. They all looked like me; they did what I had in my thoughts"
3.	Mayer-Gross (1928)	Female, n.r.	Psychosis	Depressed patient sees a crying double of herself. She closes her eyes, and, after reopening them, sees the entire room crowded with doubles, all identically looking and all crying
4.	Ehrenwald (1930)	Male, 52	Posterior left hemisphere infarction	Patient identifies himself with a motionless giant double on which many additional but tiny doubles are climbing around
5.	Ley and Stauder (1950) (case 2)	Male, n.r.	Encephalitis in the course of M. Bang	Patient sees and feels three identical doubles of himself lying to his left side. Delusional elaboration; transitivism
6.	Dewhurst and Pearson (1955); Russel and Whitty (1955)	Male, 57	Post-traumatic epilepsy; right temporal lobe lesion	In his left visual field, the patient sees "crowds of tiny figures [head and shoulders, only], all the colors of the rainbow – all myself"
7.	Hécaen and Badaraco (1956) (case 50); also in Hécaen and Green (1957) (case 4)	Male, n.r.	Tuberculous meningitis	Patient is lying on his side and sees two identical doubles, one in the left and one in the right visual field. Feels that both doubles possess some body weight
8.	Klages (1959) (case 1)	Male, 54	Gunshot lesion left parietal lobe; macrosomatognosia; depersonalization	Patient feels split into three persons. The actual self observes two other selves represented by the left and right body halves, respectively
9.	Heintel (1965)	Female, 32	Post-traumatic epilepsy; right-sided hemianopia	Patient sees multiple mirror images of herself in different sizes. Autoscopic images are localized in the interior of the patient's body
10.	Craske and Sacks (1969)	Female, 32	Healthy (during puerperium)	Patient sees a non-pregnant double straight ahead of herself. A second double covers her body "like a mask but [is] separated from it by a thin layer"
11.	Lance (1976)	Female, 62	Right occipital infarction	"Five or six" doubles imitate the patient's actions she herself had performed "a short time beforehand"
12.	Sengoku et al. (1981)	Female, 33	Temporal lobe epilepsy; right-sided focus	As an ictal experience, patient sees two doubles of herself, one with convulsions, the other supplying a handkerchief to wipe patient's saliva with
13.	Kamiya and Okamoto (1982)	Female, 21	Focal epilepsy; left-sided focus	Patient sees "multiple selves as shadows moving from left to right in visual space"
14.	Chabrol and Bonnet (1995)	Female, 12	Panic attacks with Capgras syndrome	Patient feels threatened by several identically looking doubles

"polyopic" cases, involving a multiplication rather than simply the reduplication of one's own body, have been reported. Probably the first account of polyopic heautoscopy is to be found in Müller's (1826/1967) seminal work on visual hallucinations. Returning home late from work, an exhausted university professor suddenly found himself confronted with some 15 persons, all clearly recognized as doubles of himself although they were of different ages and wore clothes he himself only wore in the past. A case of an autoscopic hallucination with multiple images is reported by Roubinovitch (1893; cited by Parish, 1894 p. 16), whose patient saw three identical mirror images of himself which he compared with the reflections he would have seen standing in front of a mirror with three wings. Passing reference to other early cases of a polyopic nature can be found in Winston (1908), Oesterreich (1910), Schneider (1931), Nadeau (1972), and in Leischner's (1961) review article on autoscopic phenomena. While these early cases have a somewhat anecdotal character, our Table I summarizes certain features of polyopic autoscopic/heautoscopy as described in more detail

in the medical-psychological literature. Out-of-body experiences, conceptually closely related to heautoscopy (Blanke et al., 2004; Brugger et al., 1997) can also involve an illusory multiplication of one's body. Cases of such multiple out-of-body experiences are reviewed in Green (1967, 1983). Tschakowskaja (1982) discusses the motif of the multiple self-portrait in the visual arts. Multiple doubles in folklore are considered in Krauss (1920) and Panoff (1968).

The 14 instances of polyopic autoscopic phenomena noted in Table I may be characterized as follows. Eight patients were female (57%) and 6 male (43%). Their mean age was 38.9 years (range: 12-62 years). With respect to etiology, 64% of the cases of polyopic heautoscopy were of neurological origin and 29% of psychiatric origin [1 case (7%) was during puerperium]. Of the neurological cases, 88% were of focal origin and due to a traumatic lesion, vascular infarction, or focal epilepsy. Of these focal neurological cases the lesion was localized as often in the right as in the left hemisphere. Either two or three doubles were noted in 43% of cases; more numerous

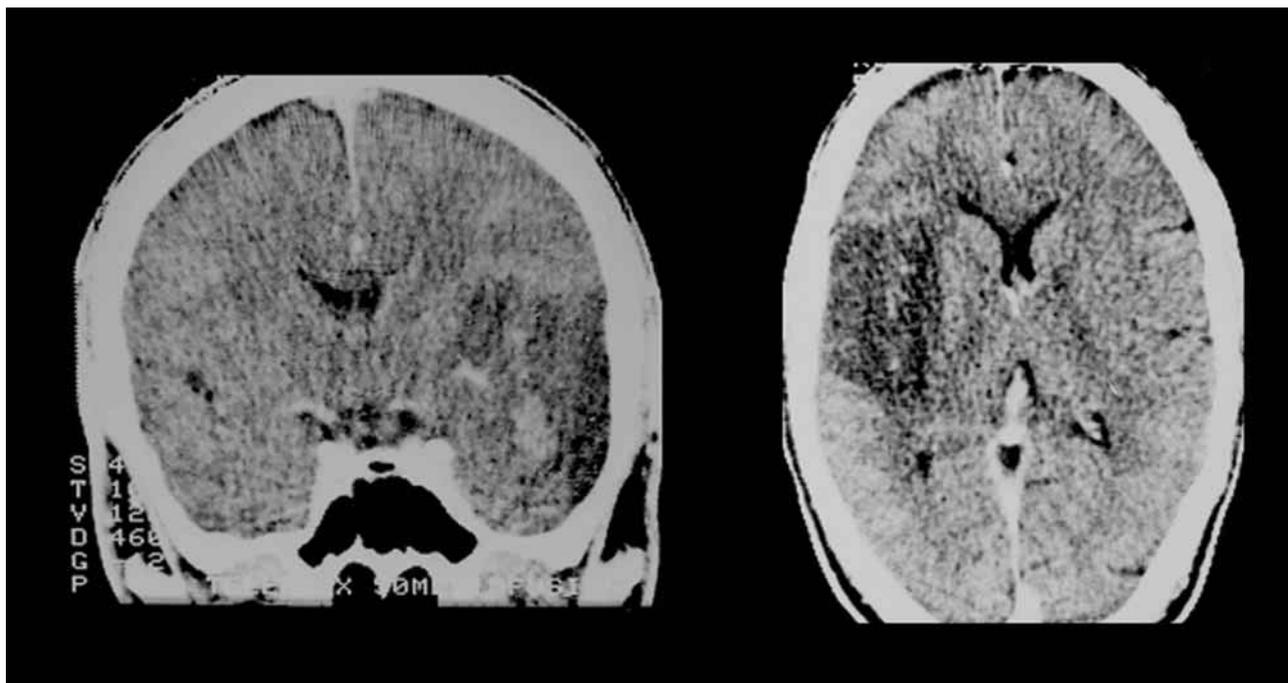


Fig. 1 – Computed tomography (coronal and transverse section) showing a space-occupying hypodense lesion in the left temporal lobe. Contrast enhancement showed a central vascularized solid part. Note that the surrounding edema extended into the parietal and frontal lobe. These radiological data are compatible with a temporal neoplasia with an insular origin.

doubles were evident in 57% of cases. In some reports, the doubles filled the entire room (Mayer-Gross, 1928) or, rather exceptionally, the interior of the patient's body (Heintel, 1965). In cases where polyopic heautoscopy was characterized by a large number of doubles, these were generally seen as quite small in size (Ehrenwald, 1930; Dewhurst and Pearson, 1955), whereas a small number of doubles was associated with a size comparable to that of the patient. Echopraxia was noted in two reports listed in Table I. In one case it was simultaneous with the patient's actual movements (Staudenmaier, 1912/1968), and in the other there was a delayed imitation (Lance, 1976). Generally, the doubles were localized in the central visual field or immediately in front of the patient's body (85%), and continuous lateralization in the visual field/peripersonal space was described in only two cases (Dewhurst and Pearson, 1955; Ley and Stauder, 1950). If mentioned at all, the perceived distances to the *doppelgänger* were generally small, i.e. they were localized within or just beyond grasping distance, which is the rule in heautoscopy. Yet, most reports (69%) did not indicate any precise distance.

We present here one more case of polyopic heautoscopy that is informative in several respects. The patient's five doubles were confined to the right hemispace, and this experience was preceded by the sensation of a split of the two halves of his body along the midline. There was no similarity between the doubles' and the patient's visual appearance; two doubles were male, three were female. The unique feature of the present case is that the extent to which the patient identified

himself with the single illusory figures diminished with increasing perceived distance from his body.

CASE REPORT

PH (fictitious initials, for 'Polyopic Heautoscopy'), a 41-year-old right-handed pottery maker, was seen at our clinic for presurgical evaluation after three months of fatigue and dizziness and recurrent seizures with gustatory sensations and inappetence. On admission, neurological examination revealed, apart from a very mild right-sided sensory hemisindrome, no positive findings. In particular, position sense was normal, and there was no visual field defect (Goldmann perimetry). Electroencephalography (EEG) showed spikes, spike-waves, and sharp waves as well as pathological slowing over the left fronto-temporal region. Neuropsychological examination revealed the following: The patient was fully oriented; his sole spontaneous complaints concerned memory problems and tiredness. He presented with an elevated mood (no affect lability) with anosodiaphoria. He had a normal digit span, implicit and explicit verbal learning were intact, active recall after one hour was, however, reduced (spared recognition). Recall of the Rey complex figure was quantitatively sufficient, but drawn with repetitious elements. Receptive and productive language functions were normal, but there was a marked logorrhoea during spontaneous speech. There were neither apraxias nor any deficits of visual perception. Cognitive flexibility (verbal and figural fluency), suppression of interference (Stroop task) and conceptual shifting were normal.

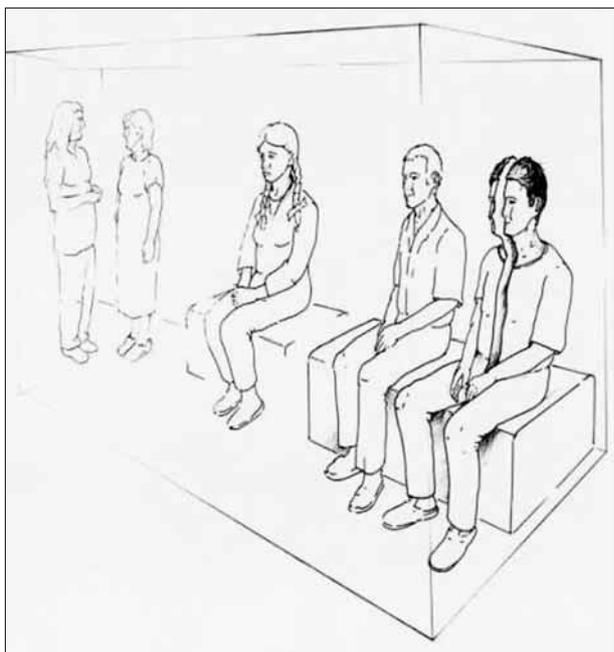


Fig. 2 – Artist's drawing according to PH's verbal description of four of his five doubles. All doubles were invariably located to the right of the patient's body. Despite nobody of the "family" of doubles reflected the patients' appearance, all members were felt to belong to the own self. The degree of motor and psychological autonomy of a double increased with increasing distance from PH's body. The presence of one additional figure was vaguely perceived (more 'sensed' than seen) at a distance of about 20 meters from the patient (not displayed). The space toward the patient's right side appeared to be stretched.

Computed tomography (CT) indicated an expansive lesion in the left insula extending into adjacent fronto-temporal cortex compatible with an astrocytoma (Figure 1).

Among the first manifestations of his illness the patient recalled the following incident: Upon awakening one night he noticed that he had split into three distinct parts: (1) the left half of his body which felt quite normal; (2) the right half, which felt detached from the left both physically and emotionally; and (3) he observed "a man" in close proximity to his right side. To a confusing degree he felt this man to be a part of himself. It was as if he and the man were "sharing the same soul". This feeling was convincing despite the fact that there was no similarity in physical appearance (for instance, the man was blond, while the patient's hair was black). Puzzled, but not frightened, by this altered bodily awareness, the patient began to walk up and down in his bedroom. He repeatedly tried to catch a glimpse of the man to his right in order to check whether, in accordance with his feelings of identity with him, the man's face would also look like his own. As he did so, he at once discovered what he later spoke of as "the family". His account (c.f., Figure 2):

"When I walked around, I repeatedly looked towards the gentleman on my side and wondered if I could recognize his face. This was impossible since on looking towards the right side he also

turned his head to the right. I could note, however, that the man was blonde and about 50-years-old. Once more trying to get a close look of him, I all of a sudden noticed that, even more to the right, there was a whole group of people. At a distance of 2 meters I saw an approximately 50-year-old lady with blond braids. Still another 4 meters away, there were two girls (both approximately age 20) and some 20 meters from me, still in a straight line with all the other persons, there was a boy (unspecified age). I knew right from the beginning that these persons were intimately linked with one another, they were father, mother, daughters and son." (In actuality, the patient's wife was younger than him and had dark short hair. His only two children were two sons, aged 10 and 16).

PH said that, with the appearance of the "family", the previously evident space between the left and right halves of his body ceased to exist. While he continued to feel a strong sense of belonging towards the man at his right side, on discovery of the other persons this sense gradually expanded to include the woman and, to a lesser extent, the girls. The boy, who "played a very minor role in the whole series of events", was eventually only vaguely seen and at certain times vanished in the darkness of the far right end of the bedroom. Referring to his remark about his "son" standing at a distance of 20 meters, we asked PH about the actual size of his bedroom. He insisted that 20 meters appeared a realistic estimate at that time; to his right, the entire room including single pieces of furniture was notably extended into the distance.

All "family" members imitated PH's every movement. When PH was sitting down, "man" and "lady" were sitting down as well (Figure 2). The "daughters" and the "son" were also able to move independently; their positions in space (i.e., their distance to PH's body) remained invariant, however. PH was impressed by the synchronization of his and the other persons' motor activity and, as a deliberate experiment; he successfully tried to influence their movements by, for example, doing push-ups.

"When I walked, the family walked with me; when I bent my knees, the others bent theirs; when I looked to the right, so did all the others. Exceptionally, however, the girls, who were commonly talking to one another, would look towards me waving their hands as if inviting me to join their world. [...] Naturally, I could not see the persons any longer on closing my eyes, but the feeling remained that pieces of myself were located in precisely those places I knew the persons were standing. It was a feeling of being awfully frittered away!"

When the patient's actual wife was sitting at his right side, the "family" would temporarily vanish, and simultaneously he perceived himself to be one person in one place again. However, he noted a clumsiness and weakness of the entire right half of

his body. As soon as his wife moved from his side, all imaginary persons would immediately reappear in their respective places. Despite considerable agitation, PH managed to fall asleep after some two hours. According to the retrospective account of the patient's wife, his speech was barely understandable throughout and contained many neologisms.

On being specifically questioned about details of his experience, the patient reported that the initially present "gap" between the two halves of his body was only felt, but not seen. Also later on, he always saw his own body in a regular way, and the bodies of the illusory family members were seen complete as well (i.e., visualization was not restricted to their upper parts or to head and face). At no time did the patient have the specific feeling of being separated from his body. His perspective was thus continuously centered on his own body, although the patient noted that by referring to "a feeling of being awfully frittered away" (see above), he wanted to emphasize that his general bodily awareness was "distorted" and the identity of body and mind was "altered" (he had difficulties in finding the accurate words to describe this state, which we will refer to as 'depersonalization' in the Discussion section).

The next morning the patient was brought to a local hospital. Initially, he was still aphasic, and he continued to be accompanied by the "family". However, he could no longer *see* the different persons. He rather felt their presence, that is, "some hardly describable sense" made him aware that the "family" was still present and enabled him to precisely localize the position of four persons in his room. Specifically, he noticed that the "father" had moved to the right while the distance to the "girls" had shrunk, such that the "family" now gathered at a distance of 2 to 3 meters from his side with the exception of the "son", who had disappeared. The patient no longer identified himself primarily with the "father" but felt that each member of the "family" was equally a "part of [his] expanded self". They jointly continued to mirror his own movements. Later the same day, they began to communicate with him (by transferring their thoughts to him rather than by normal means of verbal communication). Throughout, the messages he received consisted of comforting statements preoccupied with the theme of death and dying. The patient indicated that these communications reassured him of the harmless character of his condition. Paradoxically, he also noted that they made him seriously consider the possibility of an afterlife.

"Again and again they said I had such a lovely wife that, should I die, she would find a new partner in no time. Rather than making me jealous, these words really comforted me and reassured me in my feeling that nothing really harmful could ever happen to me".

For the rest of the day and during the second day in the hospital, the invisible family remained to the patient's right side except when someone spoke with him. After awakening on the morning of the third day, the patient noticed that all the imaginary persons had disappeared. They did not reappear, either preoperatively or postoperatively. A formal postoperative examination was denied by the patient, who preferred to stay with his closest relatives "in order to prepare himself for dying". He passed away 16 months following surgery.

DISCUSSION

The patient presented here experienced polyopic heautoscopy in the right hemispace as the first manifestation of a left-sided tumor. The clinical features are consistent with previous reports. Heautoscopy has frequently been described in patients with focal seizures due to cerebral neoplasias (e.g., Dewhurst and Pearson, 1955; Hécaen and de Ajuriaguerra, 1952). Although the primary lesion location may be the parietal lobes (Menninger-Lerchenthal, 1935, 1946; Hécaen and de Ajuriaguerra, 1952), the temporal lobes (Devinsky et al., 1989; Dening and Berrios, 1994), or occipital areas (Bhaskaran et al., 1990; Zamboni et al., 2005), focal damage to the temporo-parietal junction of either hemisphere has been emphasized both in the classic literature (Menninger-Lerchenthal, 1935, 1946) as well as in most recent case studies (Blanke et al., 2004). The lesion of the present patient is consistent with these findings. This invasive tumor probably originated in the posterior insula, was especially destructive of the left temporal lobe, but extended laterally into both parietal and frontal lobe. Some of these areas have recently been identified as part of the "cortical midline structures" intimately related to the experience of the self (Northoff and Bermphohl, 2004). Damage to the insular cortex may be particularly relevant since this region is reportedly involved in action simulation and the adoption of a viewpoint different from the regular, i.e., body-centered perspective (Ruby and Decety, 2001). Also, both temporoparietal junction and posterior insula were identified as key structures of vestibular projection areas (Fasold et al., 2002) and thus important to visuo-spatial orientation and the localization of the body in space.

Several observations emphasize the importance of non-visual, body-related mechanisms for the genesis of heautoscopy. These include, first, the presence of depersonalization as a general alteration of emotional and bodily self-awareness, which in the present case was described as an alienation from his own body, accompanied by dizziness and, later on, a feeling of being "awfully frittered away". Similar alterations in corporeal awareness were previously reported as concomitants of heautoscopy

(Menninger-Lerchenthal, 1935; Hécaen and de Ajuriaguerra, 1952; Blanke et al., 2004).

Second, there were specific somatognosic disorders such as the splitting of the own body at the median. The experience of oneself as “inhabiting” two halves of a body, spatially separated by a gap, is frequently associated with lesions of the parietal lobes (Critchley, 1955/1979, pp. 92-105; Gloning et al., 1954, case 1), but also described in patients with a psychotic disorder, either with (Müller-Erzbach, 1951, p. 90) or without accompanying episodes of heautoscopy (Bozic and Vujic, 1930). There may be a gradual transition from the feeling of having one body split into two halves to the personification of a split half-body as a double of oneself. Similar transformations can be observed in cases of hemiasomatognosia, i.e. the illusion that one half of one’s body has ceased to exist (e.g., Blanke et al., 2003; Lunn, 1970, cases 1 and 2; Menninger-Lerchenthal, 1946). In some cases, the apparent nonexistence of one-half of the body is accompanied by somatoparaphrenic delusions about “somebody else” taking its place (e.g., Ley and Stauder, 1950, p. 573; Zingerle, 1913). The initial split into two distinct halves of the body in our patient resembles the experience of Klages’ (1959) patient with a focal left-parietal lesion (case 8 in our Table I). This patient reported that it appeared to him “as if my self consists of three parts, i.e., my proper self, a left and a right side, hence together three parts that vehemently shy away from unification” (p. 267). Unlike in our case, this patient’s most prominent self observed the struggle between the two remaining selves to become united from an apparently disembodied perspective.

A third point, emphasizing the primarily non-visual nature of heautoscopy involves PH’s identification with the different “family members” despite the absence of visual similarity to the patient’s appearance. In this context, Sollier (1903) coined the term “dissimilar heautoscopy” (*héautoscopie dissemblable*), noting that the relative unimportance of visual content differentiates heautoscopy from autoscopic hallucinations (*hallucinations spéculaires*). An earlier and analogous classification of autoscopic phenomena according to the visual (dis)similarity between patient and double had been proposed by Hagen (1837), who differentiated “autoscopy” from “deuteroscopy”. In our case, three of the patient’s 5 doubles were of the opposite sex (*heterosexual heautoscopy*, after Letailleur et al., 1958). This lack of correspondence in the gender of patient and *doppelgänger* was previously described exclusively in the course of a psychotic illness (e.g., Carp, 1952; Letailleur et al., 1958), and we know of no other case of polyopic heautoscopy in which some of the doubles were of the same sex as the patient and some of the opposite sex (c.f., Table I). There were relatively few similarities between our patient

and his “closest” double (the ‘gentleman’ to his right). Yet, the patient had a strong “feeling of belonging” towards him, and it appeared to him that the two of them shared thoughts and feelings.

A unique feature of the present case is the functional relationship between spatial and psychological phenomenology. In fact, the imaginary figures localized at greater distances from the patient’s body were only detected after inspection of the “closest” double and labeled “lady” (or, sometimes, ‘wife’) and “daughters”. Feelings of identity were less pronounced for the “lady” (distance of 2 meters) compared to the “gentleman” along the right side of the patients body, and for the “daughters” (distance of 6 meters) they were even less prominent. The “son” (20 meters) had always played a minor role, was at a significantly greater distance than the rest of the “family” and was also the first figure to disappear completely. Autosopic and heautosopic doubles are generally experienced in the near personal space (Blanke et al., 2004) and only rarely localized at a distance far beyond grasping space (Dewhurst and Pearson, 1955; Lukianowicz, 1958, case B; Arenz, 2001; Blanke et al., 2004, case 1). For these more distant doubles, self-recognition and self-identification were rather vague and often only experienced once double and patient approached one another (e.g., Lubowska, 1892; McCulloch, 1992).

Most earlier cases of heautosopic echopraxia (Dewhurst and Pearson, 1955, cases 1 and 2; Lukianowicz, 1958, cases A and D) concerned a single double, and a correlation between perceived distance and the extent of echopraxia could not be assessed. In the present case, echopraxia was explicitly tested by the intrigued patient and found to be strongest and most closely matching his own body movements for the “gentleman” close by, followed by the “lady” and only occasionally by the two “daughter-doubles” at a greater distance. The patient’s movements were never imitated by the most distant “son”. This distance-related relationship between the patient’s motor actions or intentions and those of his doubles may be causally related to the interdependence between felt psychological identification and perceived physical distance. We have pointed out that the spatial characteristics of heautoscopy may be an important predictor of the psychological content of the reduplicative experience (Brugger, 2002). While we previously emphasized the aspect of spatial and psychological perspective taking, we now propose that experienced physical distance of illusory reduplications of one’s body may systematically interact with motor, visual and cognitive variables. Spatial-psychological interactions may be particularly evident in polyopic heautoscopy where multiple doubles with different characteristics are experienced simultaneously at different locations in phenomenal space.

Another link between spatial and psychological phenomenology is suggested by the present case. PH's doubles had a clearly comforting role. They made him feel secure by suggesting the possibility of a personal afterlife and by assuring him that his real family would not fall apart, even in the most serious case of his death. The patient's marked and lasting anosodiaphoria and the positive attitude of his illusory companions seem to have nourished one another. Although speculative, we wish to point to a possible association between emotional content of a heautosopic episode and the hemispace in which the reduplication or multiplication takes place. In several previous reports of unilateral autoscopic phenomena, affectively positive or at least neutral interactions were described for a *doppelgänger* confined to the right hemispace (e.g., Féré, 1890, case 13; Pailhas, 1908, case 1; Sivadon, 1937, case 2; Hécaen and de Ajuriaguerra, 1952, case 83; Brugger et al., 1996, case 2). In contrast, left hemispace lateralization is often accompanied with hostile interactions between patient and double (Carp, 1952; van Bogaert, 1934; Spiers et al., 1992) and associated with depressed mood and suicidal ideation (Persinger, 1994). This interaction between the left and the right sides of space on the one hand, and the emotional valence of an experience on the other, is reminiscent of the morbid dislike of and aggression toward a dysfunctional limb ('misoplegia'; Critchley, 1955/1979), which is more evident in left-sided as compared to right-sided hemiplegia. Likewise, in the syndrome of the anarchic limb (Marchetti and Della Sala, 1998), self-destructive behaviors are more frequently ascribed to left-sided compared to right-sided extremities (Brugger, 2001, for the references). Additional case analyses are needed to corroborate the present conclusion concerning a relationship between lateralization and affective meaning of illusory reduplications of one's own body. One alternative to this conclusion is to conceive of PH's doubles as a sign of transitivity (Wernicke, 1900), i.e. the comforting externalization of self-threatening information and its projection onto other persons, whether real or imaginary (Brugger, 2002 for overview). We note that in 3 out of the 14 cases of polyopic heautoscopy listed in Table I, transitive tendencies were apparent (case n. 3, 5 and 12). In any case, the location of hallucinations in space, previously linked to relatively low-level sensorimotor preferences of an individual (e.g., Girard and Cheyne, 2004), may be associated in significant ways with higher-order psychological states as well.

We can only speculate which mechanisms might have led to PH's experience of *multiple* doubles. It may be relevant that he observed initially only one right-sided double. Yet, once he had moved his eyes beyond the imaginary figure immediately adjacent to his body, he discovered the additional doubles more

to the right. In hemianopia, eye-movements toward the visual field defect were shown to elicit polyopia (Gottlieb, 1992). On the other hand, impaired control of eye movements is considered a major pathomechanism in classical polyopia (Bender, 1945; but see Cornblath et al., 1998, for alternative mechanisms). On this account, polyopia is assumed to result from aberrant involuntary eye movements that accompany fixation and thus lead to multiple representations of an observed (or hallucinated) object.

However, similarities between polyopia in the sense of a purely visual perseveration and the experience of multiple doubles in polyopic heautoscopy should not be overemphasized. It is highly probable that the primary multiplication originated in the somatosensory domain, and that the present case thus represents an instance of "polyesthesia". What was visually experienced as the "family" by our patient may thus represent the secondary visual interpretation of a fragmentation of his bodily self (Zamboni et al., 2005, for a similar interpretation of a case of autoscopia). Heautoscopy, whether a reduplicative or multiplicative experience, may thus reflect a disintegration of those processes that normally allow the continuous experience of having a body to which we "bind" our self (Metzinger, 2003; Northoff and Bermpohl, 2004). As in the phenomenon of the supernumerary phantom limb, where patients may experience multiplications rather than duplications of an extremity (Vuilleumier et al., 1997; Brugger, 2003, for an overview), "the person within" (Damasio, 2003), set temporarily free during autoscopic phenomena, may not necessarily be experienced as an indivisible unit.

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