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DELUSIONAL MISIDENTIFICATION SYNDROME: DISSOCIATION BETWEEN RECOGNITION AND IDENTIFICATION PROCESSES

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SUMMARY

Delusional misidentification syndrome (DMS) is an umbrella term for syndromes of intermetamorphosis, Fregoli, and Capgras. DMS) is thought to be related to dissociation between recognition and identification processes. DMS was described for the first time in 1932 as a variant of the Capgras syndrome and is currently on the DSM-V list of diseases as an independent disease entity. Patients affected by DMS believed that people around them, most often family, have changed physically (appearance) and mentally (character). Other symptoms include confabulation, derealization or depersonalization. In patients, aggressive behavior is often observed, aimed at alleged doppelgangers resulting from the sense of being cheated and manipulated. With the intermetamorphosis syndrome, for example, schizophrenia, depression, bipolar disorder or other misidentification syndromes (Fregoli's, Capgras) may coexist. There is also a reverse intermetamorphosis, where the object of the changed appearance or character becomes the patient himself. One of its forms may be lycanthropy. The etiology of the intermetamorphosis has not been fully understood, one of the reasons may be brain damage and changes in the parietal and/or temporal lobes of the right hemisphere. It may then damage long neuronal connections to the frontal areas of the brain, disturbances of working memory (WM) accountable for the keep and online management of data, so that it is available for further processing, and the patient's will be uncritical. The basic method of diagnosis of this delusion is a medical interview with the patient. Other diagnostic methods include computed tomography, magnetic resonance imaging, EEG and ERPs. Experimental methods include searching for the neuromarker of DMS. Currently, there are no treatment guidelines of this delusional disorder, and pharmacotherapy experimental, but the drugs from the group of neuroleptics and lithium seem effective. Some hope for the treatment is created by neurotherapy, but it is also experimental.

Key words: intermetamorphosis syndrome, Fregoli syndrome, Capgras syndrome, delusional misidentification syndromes, schizophrenia

INTRODUCTION

Delusional misidentification syndrome (DMS) is an umbrella term for syndromes of intermetamorphosis, Fregoli, and Capgras. DMS is thought to be related to dissociation between recognition and identification processes (Miętkiewicz et al. 2018, Silva et al. 1989, Papageorgiou et al. 2002; Pąchalska 2019a, b; Pąchalska et al. 2014). It is characterized by the belief that people from the patient's environment change in physically and psychologically in other people. It differs from the Fregoli's syndrome, in which the patient claims that people change only their physical make-up and from the Capgras, where, in the patient's opinion his friends change their character, without concomitant physical changes. DMS, therefore, seems a specific combination of symptoms of these two afore-mentioned syndromes (Miętkiewicz et al. 2018, Silva et al. 1989, Bick 1984).

DMS is often associated with schizophrenia, affective and bipolar disorders, but there are reports of coexistence with Alzheimer's or Parkinson's disease (Silva et al. 1989, Assal et al. 2003, Pagonabarraga et al. 2008).

This syndrome is a very rare condition, so in the literature lack information about it, and the descriptions are mainly a discussion of individual cases, similarly as in the case of Cotard's syndrome (Leis et al., 2018). In this article, we have collected to-date reports and the current state of knowledge about this psychiatric condition.

HISTORY

This disease was first described in 1932 by Courbon and Tusques (Silva et al. 1989, Bick 1984, Malliaras et al. 1978). Their patient was a 49-year-old woman diagnosed with depression and persecutory delusions, who claimed that people around her, including the family (husband and son), changed themselves physically and mentally. She claimed that this was due to intrigues against her.

It was considered that this delusion is a manifestation of Capgras disease. However, due to additional symptoms, common with Fregoli's, it was found that it is a separate disease entity, and today is included into DSM-V together with syndromes of Capgras and Fregoli as one of the misidentification variants (Silva et al. 1989, Silva et al. 1991).

SELECTED CASE-STUDIES

Intermetamorphosis due to the very rare occurrence and frequent coexistence with schizophrenia is described by researchers and psychiatrists most often in the form of a „case report". Below we present an overview of selected articles available in the literature. Their summary is presented in Tab 1.

In 1984, Peter Bick described a case of a 42-year-old woman who was admitted to the Endocrinology Department due to polydipsia and weight gain. Then the patient informed the staff that she heard voices urging her to commit suicide, which resulted in a transfer to a Psychiatric ward. For 15 years, the woman was

Tab. 1 A summary of case series of patients with Intermetamorphosis syndrome

Factors	Silva et al. (1989)	Silva et al. (1990)	Silva et al. (1991)
Studied population number	N=3	N=2	N=15
Subjects characteristics	three men, age: 29, 41, 48	one woman, age 52 and one man, age 32	12 men and three women, age 23-52
Object of delusion	Mother Family	Family US' Presidents	Family Neighbours Friends Politicians Self (N=6) Mother (N=7)
Comorbidity	Alcohol dependence syndrome Bipolar disorder Depersonalization Opiates abuse Schizophrenia	Depression	Depression (N=8) Schizophrenia (N=7) Capgras Syndrome (N=9) Fregoli's Syndrome „Reverse" Intermetamorphosis (N=3) „Reverse" subjective doubles (N=4)

Source: Silva et al. 1989, Silva et al. 1990, Silva et al. 1991

treated psychiatrically, initially due to addiction to amphetamine (resulting from the loss of her daughter), later she was diagnosed with grand mal epilepsy and paranoid schizophrenia. She claimed that her stepfather abused her physically and sexually. During the hospitalization, her mood was lowered, and the patient maintained that she was hearing voices all the time, accompanied by visual hallucinations (including the deceased child) and olfactory hallucinations (the smell of her corpse). During one of her conversations with the doctor, she began to address him, „Uncle Harry," confusing him with her deceased relative. The EEG study carried out showed, among others brain dysfunction in both hemispheres, the presence of abnormal waves and background disturbances. A decision was made to administer haloperidol in a daily dose of 50 mg, which resulted in symptoms alleviation after 2 days (Bick 1984).

Malliaras et al. reported in 1978 about the occurrence of intermetamorphosis syndrome in a 19-year-old woman. She has had symptoms such as hallucinations, insomnia, false memories, impaired concentration, anxiety, sexual and religious delusions, depersonalization and derealization for a year. Later on, the characteristics of illusion d'intermetamorphose developed. She began to believe that various people around her are the same man – her spiritual director, who, moreover, according to her imaginations, was in love with her. The woman also claimed that she has divine powers and experiences a vision. She had episodes of dematerialization and erotic delusions associated with her religious guide, which she believed had the ability to change physical and psychological characteristics. The patient's health condition began to improve after 6 weeks of admission to the hospital, and only after 3 months, all symptoms subsided. During the stay in the ward, a woman's EEG examination was performed, which re-

corded the presence of abnormal waves, the most visible in the temporal lobes as well as background disorders (Malliaras et al. 1978).

In 1989, Silva et al. published descriptions of three cases of people suffering from intermetamorphosis syndrome. The first patient was a 48-year-old man who behaved aggressively and made death-threats toward his mother. He claimed that the real mother has been dead for 20 years and, for several years now, he is dealing with the mother's look-alike (differing in appearance and behavior from his „real" parent) that wants to control him. During his stay in the psychiatric ward, he exhibited such symptoms as, for example, disturbances in judgment, thinking aloud, racing thoughts, insomnia, logorrhea or agitation. Alcohol dependence syndrome and bipolar affective disorder were also diagnosed. The patient was given neuroleptics and lithium carbonate, that improved his clinical condition (symptoms of misidentification also subsided) (Silva et al. 1989).

The second described patient was a 41-year-old male, similarly to the previous one, he was referred to a psychiatric ward as a result of aggressive behavior and attempts to attack a mother with a knife. He claimed that his „real" mother was actually younger than the alleged cheater with which he lived, but both showed similar character traits. In his opinion, he was 20 years old, recently he left the army, while the mafia killed his family. The dead loved ones of the patient were later to be replaced by strangers who did not differ in appearance. The patient also displayed signs of depersonalization; he claimed that he lost limbs during the Vietnam War, and these are only artificial prostheses. He believed that he had a great fortune, and the fraudsters pretending to be his family wanted to deprive him of it. These symptoms have been present for 3 years and his psychiatric history showed the presence of psychosis, alcohol dependence syndrome and dependence on marijuana. The EEG of the patient showed no abnormalities, while there were disturbances in the memory. Pharmacotherapy consisting of neuroleptics and lithium carbonate was implemented, resulting in the patient claiming that only his mother and uncle were replaced (Silva et al. 1989).

The third patient described by the group of researchers is a 29-year-old man, with a five-year-long idea that he is an important person in terms of politics and finances. He believed that when he was a child, his parents died and were swapped by doppelgangers who, however, differed in appearance and behavior from the „originals". The scammers tried to resemble the „real" mother and father by implanting synthetic masks. According to the patient, they were not effective, furthermore, he maintained that he saw their faces without masks. The patient was diagnosed with paranoid schizophrenia, but the treatment did not bring the expected results (Silva et al. 1989).

The described patients classified by the researchers as illusion d'intermetamorphos, although displaying similar symptoms of misidentification, differ in their perception of the character and appearance of the allegedly replaced persons: the first and third patients believed that the look-alikes of their loved ones exhibit different characteristics than the originals; second claimed that the double had a similar character but that it differed in its physical appearance. Second patient's

delusions do not belong to the characteristic image of the intermetamorphosis syndrome, where both physical and mental characteristics change, the change in appearance only is typical of Fregoli's syndrome, but the researchers ruled out its the occurrence.

A very valuable source of knowledge about the intermetamorphosis syndrome is the publication of Silva et al. From 1991, where researchers compile as many as 154 cases of patients (12 men and 3 women) suffering from this rare delusion. The patients were between 23 and 52 years old, and the mother was the most frequent object of impaired identification (7 cases), in 6 cases the structure of their own „self" was also disturbed (three met the conditions of the „reverse" subjective doubles, one of Capgras, one of „reverse" intermetamorphosis and one both „reverse" subjective doubles and „reverse" intermetamorphosis syndrome). Each of the discussed patients had a co-morbid disease, the most, as many as 9 of them had diagnosed schizophrenia. Another often occurring diagnosis was the Capgras syndrome – recorded in 7 cases (Silva et al. 1989).

In 1990, Silva et al. discussed two cases of intermetamorphosis delusions. The first patient was a 52-year-old woman who, in her opinion, was admitted to the hospital because of paranoia and aggressive behavior. For 3 months, she also experienced insomnia and weight loss, and she was treated for 15 years due to depression. She claimed that her daughter-in-law crucified her granddaughter, which caused her to attack the former. Her sons, on the other hand, were controlled by the government and were born without a few organs, and as a result, with time, she began to question their reality (these symptoms helped diagnose co-occurring Cotard syndrome, where these types of symptoms occur). She claimed that they were robots or monsters, and she also believed that they possessed distorted faces (Leis et al. 2018, Silva et al. 1990).

The second patient, on the other hand, was a 32-year-old man, displaying, among others hallucinations, insomnia, and depression. He believed that there are several people who look identically like him, his brother and father, that his sisters are the same in terms of physical characteristics and that a woman claiming to be his mother is not really her. In addition to identification disorders affecting his family members, the patient also claimed that former US presidents have clones (Silva et al. 1990).

Pachalska et al (2011) described progressive deterioration in personal identity in a former physician who had sustained a serious head injury (1998), resulting in focal injuries to the right frontal and temporal areas. He regained consciousness after 63 days in coma and 98 days of post-traumatic amnesia, but has since displayed a persistent loss of autobiographical memory, self-image, and emotional bonds to family and significant others. Qualitative 'life-story' interviewing was undertaken to explore the mental state of a patient whose subjective, "first person" identity has been disengaged, despite the retention of significant amounts of objective, "third person" information about himself and his personal history (though this was also lost at a later stage in the patient's deterioration). Identity change in this patient patient was characterized by a dynamic and convoluted

process of contraction, expansion and tentative balance. He tends to cling to the self of others, borrowing their identities at least for the period he is able to remember (Pąchalska et al 2011). Over the time he claimed that his family are monsters, and he also believed that they possessed distorted faces and finally he developed Cotard syndrome in which he holds the delusional belief that he is already dead, and do not exist (cf. Pąchalska 2019a, b).

The case studies described above indicate that particular DMS syndrome can occur separately, overlap and even change into others in the patient with progressive brain atrophy and therefore destabilization of neuronal connections.

SYMPTOMS

The basic symptoms that determine the diagnosis of the intermetamorphosis syndrome include the patient's view that the people in his or her surroundings change in terms of character traits and physical appearance (Silva et al. 1989, Bick 1984). Depersonalization, derealization or false memories are also possible (Malliaras et al. 1978). However, these symptoms may mask the co-occurring schizophrenia, which may cause difficulties in the diagnosis of the syndrome. Intermetamorphosis syndrome can also result in aggressive behavior of the patient, in extreme situations also leading to the murder of the alleged doppelgangers (Silva et al. 1991).

As in the case of Fregoli's syndrome, there is also an inverted type of disease, so-called inverted intermetamorphosis, in which the symptoms focus not on the person in the patient's environment, but on the patient himself (Hanin et al. 1994). His form can be lycanthropy, which is the belief that a person can transform into an animal, usually a werewolf (Moselhy et al. 1999).

Symptoms are closely related to the environment, culture or character of the patient, for example, a religious person believes in the transformation of people from his/her environment, while a less religious person, more connected with the broadly understood science will think that replacing people has happened with the help of modern technologies (Silva et al. 1989).

In contrast to the Capgras syndrome, it belongs to the hyper-identification group together with Fregoli's syndrome. Intermetamorphosis distinguishes itself from the Capgras syndrome because it contains also a supposed change in physical characteristics, and from Fregoli's – because changes in appearance coincide with the alleged change in character traits (Miętkiewicz et al. 2018, Silva et al. 1989, Bick 1984).

DIAGNOSTICS AND ETIOLOGY

The basis for recognizing the intermetamorphosis syndrome due to its rare occurrence is the doctor's interview. Lack of symptoms of misidentification excludes the occurrence of this delusion and points diagnostics towards, for example, schizophrenia (Silva et al. 1989, Bick 1984).

The disease often occurs with central nervous system pathologies. The pres-

ence of such disorders may prove to be an important diagnostic factor (Pąchalska et al. 2011).

A case of coexistence of the intermetamorphosis syndrome together with Fregoli's syndrome has been reported, where bilateral brain tissue ischemia at the temporal region has been observed (Joseph 1985). In the analysis of Silva et al. out of 15 patients as many as 9 used psychoactive substances or had a diagnosis of epilepsy or brain damage (Silva et al 1991).

According to Arısoy et al., who described the case of the patient who developed: Capgras syndrome, paramnesia, intermetamorphosis syndrome and reverse intermetamorphosis, the reason for delusional misdiagnosis may be impaired visuospatial functions as well as abnormalities occurring within the right hemisphere (Arısoy et al. 2014). Edelstyn et al. also came to similar conclusions, dealing with a patient with disorders in the subcortical white matter of the parietal lobes and frontal in the right hemisphere. The patient had impaired facial recognition ability, because of that, researchers postulated that abnormalities in the white matter of the right cerebral hemisphere may be the cause of the development of misidentification syndromes such as the syndromes of Capgras or the intermetamorphosis (Edelstyn et al. 2001).

The EEG test may also play an important role in the diagnosis of the disease. Some patients in the described cases showed abnormal waves in the performed electroencephalography and the presence of background activity (Bick 1984, Malliaras et al. 1978), however, the physiological pattern does not exclude the occurrence of the disease (Silva et al. 1989).

According to Pąchalska 2019a, b, misidentification syndromes can be detected by performing tests that reveal dysfunctions within the brain, which include: magnetic resonance, positron emission tomography (PET), computed tomography, or single photon tomography. The most often right hemisphere is damaged, followed by parietal-temporal cortex and frontal lobe, and the essence of the onset of symptoms is a disorder within the subcortical, anterior and posterior connections (self-consciousness and modality dysfunction). Abnormalities may also occur in the parietal lobe of the right hemisphere and may also lead to atrophy of the frontal and temporal lobes (cf. Miętkiewicz et al. 2018, Pąchalska et al. 2011).

The N170 component and the N250 component also change in misidentification disorders. The first of them is responsible for the emotional interpretation of the face and the second for perception, which is disturbed in the intermetamorphosis syndrome (Pąchalska 2019a).

In this disease, working memory (WM) is damaged, a complex system often identified with short-term memory however, considered by Ericsson (cited by Pachalska et. al 2014) as a kind of long-term memory, responsible for the proper functioning of cognitive processes, storage and disposition of online information and enabling the taking of conscious decision. As a result, executive control is disturbed and identification and recognition disorders occur. There are changes in parietal lobes and anterior cortex as well as an increase in the metabolic rate in the sensors association cortices and a decrease in the following structures:

cingulate areas and orbitofrontal areas (Ericcson et al. 1995; Papageorgiou et al. 2002, Diamond 2013; Pąchalska 2019a).

TREATMENT

Currently, due to the rarity of intermetamorphosis syndrome, there is no specific treatment regimen for this delusion, as is the case with other delusions of misidentification or rare disease entities such as Cotard syndrome (Miętkiewicz et al. 2018, Leis et al. 2018). Psychiatrists usually use experimental treatment, often focusing on coexisting diseases such as schizophrenia.

In the discussed cases, illusion d'intermetamorphose was successfully treated with haloperidol (the symptoms resolved after 2 days) or haloperidol in combination therapy with lithium carbonate. However, the health of one of the patients described by Silva et al. with coexisting paranoid schizophrenia, despite the implementation of neuroleptics therapy, has not improved (Silva et al. 1989, Bick 1984).

The current literature also provides information on the successful pharmacotherapy of haloperidol combined with valproic acid (de Leon 1992). Another case report indicates ineffective treatment with neuroleptics and the resolution of symptoms occurred only after clorazepan (Joseph 1987). The functional brain neuroimaging like MEG, gEEG and ERPs illustrate real brain activity in milliseconds are offer sporadically (Pąchalska, Kaczmarek, Kropotov 2019). It allow us to track that DMS can persist in the form of Capras syndrome, overlap with another syndrome such as Fregoli or Cotard, or turn into it during the course of the disease. It is associated with the breakdown or destabilization of neuronal connections. However, the onset of illness (the cause) is not only assumed to set in train a cascade of events (the symptoms), but rather it is a process (the patient's life as a whole), whose course has been radically altered by an event. This is illustrated by Fig. 1.

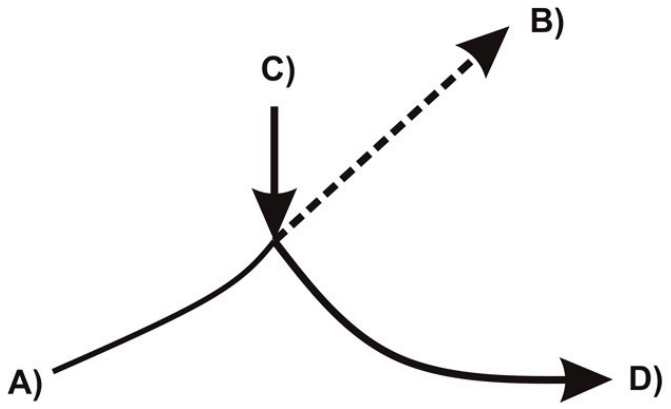

Fig 1. A schematization of changes in trajectory caused by a sudden event
Source: Pachalska 2019

For the present purposes, let segment A-B represent the course of particular patient's life, where A represents the starting point and B the goal to which he aspires. The appearance of a strong external force (C, here representing the illness) pushes the vector in a different direction, to patient's current status, represented as D. What is most important here is that the vector C-D is not simply the result of the direction and strength of C, but rather the effect of C on the original vector A-B (see also Pachalska et al 2011, 2012).

The fluctuation of syndromes observed in DMS can be best explained by microgenetic theory. The syndromes described here results from the unfolding of the lower layers of the process of becoming, from core (self) to perception (world), which frames the mind/brain state. Consciousness is the relation of early to late or depth to surface in this process (Pąchalska et al 2012b; 2018). Visual and verbal imagery, including conceptual or intentional feeling, arise at intermediate phases, so long as an external world is realized. The arrow in Fig 2 represents sensation acting on the phase of imagery to externalize and adapt the state to the physical world. The phase-transition is non-temporal until it terminates. The mind/brain state and immediate present develop in a fraction of a second, replaced by overlapping states.

Microgenetic theory provides an account of the process of creating the self in norm and in pathology (Pąchalska 2019a). It emphasizes the span of neural time (in microseconds in the case of a healthy adult) that on the one hand enables continuity of the self, and on the other buffers it from falling apart. The way the self is structured is shown in Fig. 3. There is a minimal self, the irreducible core, whose existence is necessary in order for the organism to be an organism, and not merely a collection or colony of cells (Pąchalska 2019a,b; Pąchalska et al 2011; 2012a).

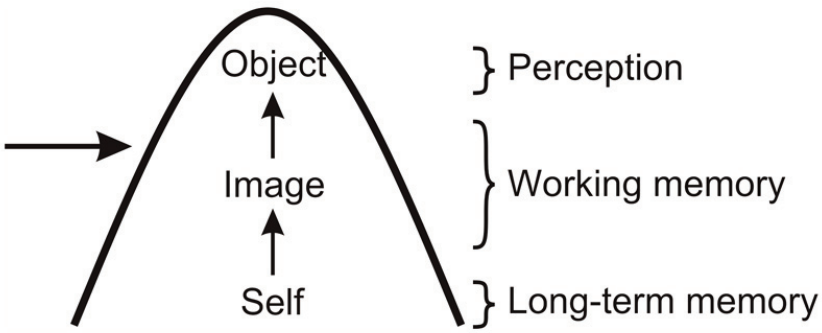

Fig. 2. The transition, or process of becoming, from core (self) to perception (world) frames a mind/brain state. Consciousness is the relation of early to late or depth to surface in this process. Visual and verbal imagery, including conceptual or intentional feeling, arise at intermediate phases, so long as an external world is realized. The arrow represents sensation acting on the phase of imagery to externalize and adapt the state to the physical world. The phase-transition is non-temporal until it terminates. The mind/brain state and immediate present develop in a fraction of a second, replaced by overlapping states.
Source: Pąchalska, MacQueen, Brown 2012a.

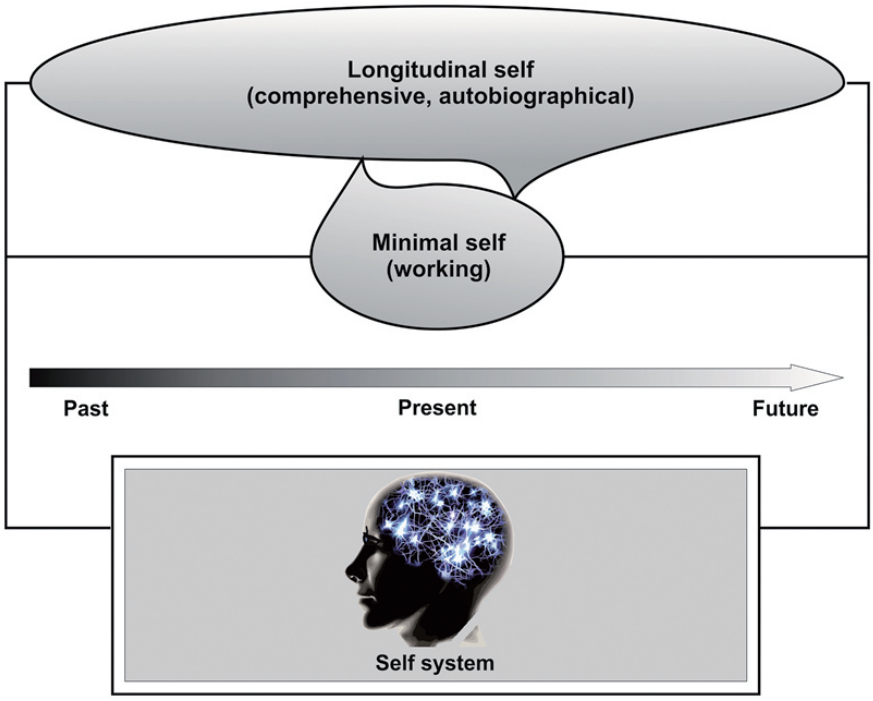

Fig. 3. The interconnections among the self and the minimal and longitudinal self
Source: Pachalska 2019

This minimal (working) self in our most fundamental biological/mental state, the awareness of being "right here right now" and having some kind of experience. A longitudinal self arises when memory allows the discrete moments of "minimal self" time to be bundled in larger units, making it possible not only to feel one's existence in the present moment, but also to conceive of that existence in the past and imagine it continuing into the future.

The subliminal "me" that remains beneath as the potential for the 'I' is implicit, unconscious and inaccessible. It represents, or is part of, the tacit knowledge of the individual, what the person knows or has the capacity (competence) to know, and it gives rise to the conscious self, to thought and action. The known self is not actually known, it is felt, intuited, sought after. It participates covertly in thought, but is not ultimately revealed.

VARIABILITY OF SYNDROMES

The changes that have occurred in the clinical picture of mental status of the patient with DMS are perplexing. He/she may passed through a mosaic of syndromes, which resulted in a continuous deterioration of his/her identity: (1) misidentification (person and place); (2) Capgras syndrome for person(s); (3) Capgras for environment; (3) Capgras for the arm (asomatognosia); (4) Frégoli

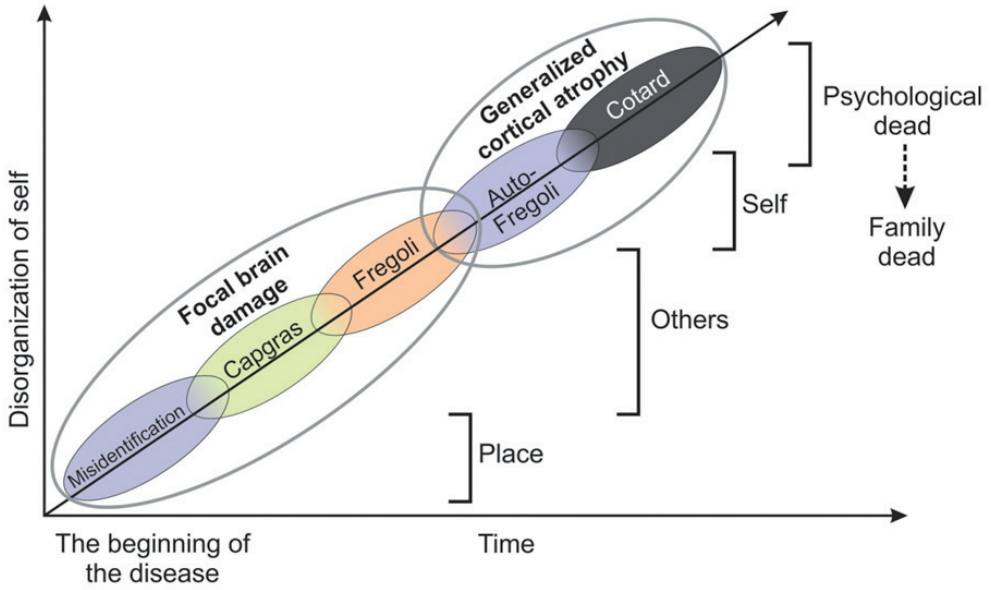

Fig. 4. The transition from misidentification through Capgras to auto- Fregoli and Cotard's delusion (psychological death)
Source: Pąchalska 2019 a

syndrome for person(s); (5) Frégoli for environment; (6) Delusional reduplication (without misidentification) of self or other persons; (7) Loss of identity (Cotard's syndrome, the delusion of being dead) (see: Fig. 4).

This approach to the formation of symptoms in DMS is not only new, but belongs to the Evidence-based medicine (EBM), the facts medicine which allows a better understanding of the patient's problems, and thus better Evidence-based treatment (EBT). And it is in this direction that further scientific research and therapy of DMS syndrome should be carried out.

CONCLUSIONS

Delusional misidentification syndrome (DMS) is an umbrella term for syndromes of intermetamorphosis, Fregoli, and Capgras. DMS) is thought to be related to dissociation between recognition and identification processes. It is a clinically significant problem not only because of frequent inclinations to aggression towards people who are considered to be „impostor", but significantly worsening the quality of life of the patient. However, the etiology has not been clearly explained. One of the reason is that diagnostics consists mainly of an interview with the patient, followed mainly by neuroimaging such as computed tomography or EEG. The functional brain neuroimaging like MEG, gEEG and ERPs illustrate real brain activity in milliseconds is extremely rare. Therefore the treatment is based mainly on experimental pharmacotherapy, often focusing on a comorbid

illness such as schizophrenia. Modern technologies such neurofeedback, tDCS or TMS, are offer sporadically.

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