Section 1 Abnormalities of Belief and Judgement

Chapter 1

Delusional Misidentification Syndromes

1.1 Introduction

The delusional misidentification syndromes include Capgras syndrome, Frégoli syndrome, syndrome of intermetamorphosis, syndrome of subjective doubles, delusion of inanimate doubles and reduplicative paramnesia (Capgras, 1923; Anderson & Williams, 1994; Ellis, Luauté & Retterstøl, 1994; Christodoulou et al., 2009). These conditions are of great and continuing interest to psychiatrists, neuropsychologists, neuroscientists and philosophers alike because of their intriguing clinical presentations and the fact of the possibility of linking discrete beliefs to neural and neuropsychological underpinnings.

Capgras syndrome is perhaps one of the best known and most discussed examples of the delusional misidentification syndromes. It is characterized by the firmly held but false belief that an impostor has replaced a familiar person (Silva & Leong, 1992; Ellis, Whitley & Luauté, 1994; Christodoulou et al., 2009; Abbate et al., 2012).

In Frégoli syndrome, the subject believes that an unfamiliar person is really a disguised familiar person, whereas in the syndrome of intermetamorphosis, the subject believes that the unfamiliar and familiar persons are identical because of shared physical characteristics such as hair colour or shape of nose. The syndrome of subjective doubles is characterized by the belief that a double of the self is abroad in the world acting in such a way as to damage the subject's reputation. The delusion of inanimate doubles refers to the belief that inanimate objects have been duplicated and replaced, whereas reduplicative paramnesia refers to the belief that places have been duplicated.

Central to these conditions is the concept of the 'double', a concept that was present in mythology in antiquity and has carried on into the fictional narrative in the present day. Plautus's *Amphitryron* is a Roman tragicomedy in which Jupiter takes on Amphitryon's appearance in order to sleep with Alcmena, Amphitryon's wife. Mercury takes on Sosia's (Amphitryon's servant) appearance in order to delay Amphitryon's return. The success of this comedy of errors turns on the concept of doubles – Jupiter acting as Amphitryon and Mercury as Sosia. This story was the source of the original name for Capgras syndrome, namely *illusion de Sosie.* This literary preoccupation with the concept of the double is present in Dostoyevsky's *The Double* and Shusaku Endo's *Shame*.

The concept of the double is important in popular culture and as a device in literature because of the implications regarding the fragility of identity by way of facial recognition and also because of the challenges it posits to our notion of the physical uniqueness of persons, a uniqueness that is only truly breached in the case of identical twins. The possibility that persons, objects, places and even time might not be unique is at the core of delusional misidentification syndromes. This idea that duplication is possible and even

probable and that against better judgement it can be firmly held as self-evident and established even in the face of counterargument and factual impossibility raises a welter of queries – as much about normal processes as about abnormal phenomena. Among the many questions is how we come to recognize faces, people, objects, places and so on and how we come to mark them as unique examples of a class even in the context of marked changes over time. I mean by this the fact that we continue to identify an individual from cradle to grave as the same person despite significant changes in physical appearance over time. The urgent and continuing fascination with the delusional misidentification syndromes derives at least from the many theoretical, philosophical and empirical matters they raise. There is the added underlying assumption that these conditions may provide the basis for examining and investigating the neurological basis of delusions in general, as is argued later.

Delusional misidentification syndromes are commonly regarded as rare conditions. Estimates of the prevalence range from 0.001 to 4.1 per cent (Joseph, 1994; Kirov, Jones & Lewis, 1994; Moselhy & Oyebode, 1997; Tamam et al., 2003). However, the prevalence in neurodegenerative disorders may be as high as 16.6 per cent in Lewy body dementia, 15.7 per cent in Alzheimer's dementia and 8.3 per cent in semantic dementia (Harciarek & Kertesz, 2008). Early reports suggested that these disorders occur exclusively in females, but it is now clearly established that males are afflicted as well.

These conditions can occur in schizophrenia, affective disorders and organic brain diseases (Förstl et al., 1994; Joseph, O'Leary, Kurland & Ellis, 1999b; Feinberg & Roane, 2005; Sidoti & Lorusso, 2007; Oyebode, 2008; Christodoulou et al., 2009). There is evidence that the right hemisphere has a role in the pathogenesis of these disorders (Cutting, 1991; Ellis, 1994) and that impairment of face processing including impairment of face-recognition memory is an important underlying anomaly in subjects who present with delusional misidentification syndrome (Paillère-Martinot et al., 1994; Edelstyn et al., 1996; Edelstyn, Oyebode & Barrett, 1998; Breen, Caine & Coltheart, 2000). The fact that delusional misidentification syndromes are associated with neurological, neuropsychological and neurophysiological correlates makes them ideal subjects for further investigation as to the origin and genesis of delusions (Christodoulou & Malliara-Loulakaki, 1981; Förstl et al., 1994; Munro, 1994; Paillère-Martinot et al., 1994; Papageorgiou et al., 2005; Ismail et al., 2012). In other words, these conditions, being relatively discrete and susceptible to clear description, allow for the study of the neurological underpinnings of delusional beliefs and perhaps even underscoring the processes and functional impairments that determine the nature of delusions.

In the next section, I will focus on the original case descriptions, concentrating on the distinctive aspects of the respective syndromes and drawing attention to issues that are yet to be resolved. I will then turn to the classification and pathogenesis of delusional misidentification syndromes and the relevance of these to our understanding of the nature of delusions in general.

1.2 Classical Case Descriptions

1.2.1 Capgras Syndrome

Capgras syndrome was first formally described in 1923 by Capgras and Reboul-Lachaux (Capgras, 1923). The patient was a 53-year-old woman, Mme M, who had a 10-year history

of presenting with the systematized belief that many people including her husband and daughter had been transformed into doubles. It is a complex case presenting with predominantly delusions of grandeur and persecution, but it is remembered for the fact that Mme M believed that numerous people had been transformed into doubles. The principal beliefs in this case that are of relevance to Capgras phenomenon are as follows:

1. Mme M believed that she was substituted at birth and that her father had acted criminally to abduct and hide her from her real parents, the Duke of Broglie and Mlle de Rio-Branco, the daughter of the Duke of Luynes. Mme M said, '[N]ever having divulged my birth, many people only know the name of the person who brought me up; it's these doubles who have given me the name of their children, that's why they have changed my personal details.' (Ellis, Whitley & Luaute, 1994, p. 125)
2. She believed that she had two or three doubles who were known to her and said, 'I was blond, they have made me chestnut, with eyes three times the size; they were rounded in front, now they are flat: they put drops in my meals to take away the features of my eyes, and the same with my hair; as for my chest, I no longer have one . . . and that's why no-one recognizes me anymore and why people are making use of my good previous history [delusion of subjective doubles and reverse Frégoli syndrome].' (Ellis, Whitley & Luaute, 1994, p. 122)
3. She believed that her children were objects of substitution. She said, '[T]hey always gave me some other girl, who in turn was taken away and then immediately replaced. . . . As soon as they took one child away they gave me another who looks just the same: I have had more than two thousand in five years: they are doubles.' (Ellis, Whitley & Luaute, 1994, p. 122)
4. She believed that her husband was a double. She said, '[I]f this person is my husband, he is more than unrecognizable, he is a completely transformed person. I can assure you that the imposter [*sic*] husband that they are trying to insinuate as my own husband, has not existed for ten years, is not the person who is keeping me here.' (Ellis, Whitley & Luaute, 1994, p. 122)
5. She believed that the concierges were doubles, as were the other tenants in the building. And in hospital at Maison-Blanche she believed that nearly everyone was a double. She said, '[T]he theatre that is played out by these doubles is unbelievable.' The doctors, nurses and patients were also involved. She said, '[T]he doctors that come here wearing capes, don't tell me there is only one of them, I know at least fifteen! . . . [T]he sister is sometimes kind, sometimes annoyed: these are doubles. For each sister there are fifty, they give their orders through doubles. The young daughter of this Sister also has doubles. The number of sisters who have disappeared is unbelievable [clonal pluralization].' (Ellis, Whitley & Luaute, 1994, p. 124–5)
6. She explained why she is convinced of there being doubles, saying, '[T]hat can be seen by certain details . . . a little mark in the ear . . . a thinner face . . . a longer moustache . . . different colour eyes . . . the way of speaking . . . the way of walking.' She explained what she meant by doubles: 'Doubles . . . are people who resemble each other.' (Ellis, Whitley & Luaute, 1994, p. 129)

These features of Capgras phenomenon remain the essential characteristic features, namely the belief in 'duplicates' or 'doubles' of persons, usually familiar persons. However, there are other autobiographical accounts of the same phenomenon that predate the description by Capgras and Reboul-Lachaux. For example, Daniel Schreber, in his *Memoirs of My Nervous Illness*, which was published in 1903 (Schreber & Macalphine, 1955, p. 104), wrote

> I saw there several ladies, among them Mrs W., the wife of a Pastor in Fr., and my own mother, also several gentlemen, among them the Councillor of the County Court K., of

> Dresden, with an ungainly enlarged head. Even if I wanted to try to convince myself now that I had only been deceived by fleeting similarities of external appearances, this would not suffice to explain to me the impressions I had at the time; I could understand such likeness occurring in two or three instances but not the fact that, as I will show, almost all the patients in the Asylum, that is to say at least several dozen human beings, looked like persons who had been more or less close to me in my life.

What is significant about Schreber's account is that it does not refer to the terms 'double' or 'duplicate', but nonetheless it is clear that his experience is grounded in the belief that he perceived identity between people who were well known to him and others that he saw in the asylum and that the identification was based on the identity of appearance. This allows us to grasp one of the fundamental and implicit aspects of delusional misidentification syndromes, namely that objects including human beings may not be unique and singular but also that they can be replicated as more or less accurate facsimiles. To extend this point, Capgras phenomenon does not merely relate to being in the presence of the supposed original but erroneously believing that the original is actually a copy but also to cases where in the presence of a novel object to believe that it is an exact replica of the original. The distinction between this and the following syndrome, Frégoli syndrome, is that in Frégoli syndrome it is accepted by the patient that the physical appearances are different, but this discrepancy merely covers the true facts that the real individual is hiding behind a mask, so to say.

Once this subtle variation in the form of Capgras phenomenon is recognized, then the account by John Perceval (1840/1962, p. 266) becomes understandable.

> During the same year, I also saw the faces of persons who approached me, clothed in the features of my nearest relations, and earliest acquaintances, so that I called out their names, and could have sworn, but for the immediate change of countenance, that my friends had been there.

Here we see the patient recognizing in disparate individuals familiar and distinct facial features of his close relatives such that he mistook these unfamiliar people as relations or acquaintances. What is notable is that the recognition is based on identity of distinct characterizing features. This description anticipates the delusion of intermetamorphosis that follows later.

It is less well recognized that Capgras phenomenon is not restricted to faces or persons. Indeed, this is a condition that can affect all the principal sensory modalities. It is not solely a phenomenon of visual perception, nor of facial recognition only. It is well accepted that visual objects other than the face can be affected (Oyebode & Sargeant, 1996), hence the description of delusions of inanimate doubles (Anderson & Williams, 1994), but the involvement of audition and gustation is less well recognized. But this is perhaps not surprising given the relative rarity of these presentations. Examples include

1. A young man who believed that his younger brother had switched his vinyl records for poor copies because the music sounded different when he played the records, and this difference was indefinable and not attributed to scratches. Superficially, this case pointed at duplicated vinyl records, but in fact the originating phenomenon was altered musical audition.
2. A female patient who claimed that her meals tasted differently including strawberries and concluded either that the meals had been tampered with in some manner or altered, with the purpose of poisoning her. Here her gustatory experience of the taste of strawberries did not match her expectation of what strawberries tasted like, and she then had the erroneous belief that her meals had been tampered with.

There is no reason to suppose that Capgras phenomenon does not affect olfaction or other sensory modalities except that examples of these are yet to be described.

What the above-mentioned cases demonstrate is that the underlying anomaly, at least in some cases, involves discrepancy between prior expectations of the nature and identity of a sensory object and the actuality of the experienced object. The beliefs expressed by the patients, on the face of it, seem merely to be attempts to reconcile these discrepancies. Hence beliefs about doubles are explanations given for the perceived but minute differences between the expected sensory object and the actually perceived object. By definition, the sensory object could be a visual, aural, gustatory, or other sensory object.

1.2.2 Frégoli Syndrome

In 1927, Courbon and Fail (1927) described the case of a 27-year-old woman who claimed that her 'persecutors are capable of all types of transformation and can impose such transformations on others: they are Frégoli who can frégolify any and everybody' (Ellis, Whitley & Luaute, 1994, p. 134). This syndrome was named after Léopoldo Frégoli, an Italian actor who was reputed to be able to transform himself into various people while on stage.

Leopoldo Fregoli 1857–1936

The patient believed that she was 'the victim of enemies, of whom the main culprits [were] the actresses Robine and Sarah Bernhardt, whom she often went to see in the theatre' (Ellis, Whitley & Luaute, 1994, p. 134). She believed that 'for years they [had] pursued her closely, taking the form of people she knows or meets, taking over her thoughts, preventing her from doing this or that, then forcing her to do things, stroking her and forcing her to masturbate'. She 'recognized members of her own family among the other actors. A female employer who had attempted to caress her three years earlier was Robine. The woman she met and attacked in the street because of the annoying sensation she felt coming from her was also Robine. . . . The hospital doctor who has never been to Choisy nor bears any resemblance to anyone she has ever known, becomes her dead father or even Dr Leroux, a doctor who saved her when she was three months old, whom she has never seen since and whose features she cannot recall. In the same way, the intern becomes her cousin' (Ellis, Whitley & Luaute, 1994, p. 135).

Courbon and Fail concluded that the defining features of their newly described syndrome were that (1) in Capgras syndrome, the doubles were distinct beings who could be confused with one another because of their perfect resemblance, but their personalities were distinct even if appearances were the same, and (2) in Frégoli syndrome, there was a single personality but numerous and varied appearances. In other words, there were several individuals who bore no resemblance to one another but who were incarnations of another person whom they did not resemble. To emphasize the point, in Frégoli syndrome, there is no physical similarity between the individual who is the target of recognition and the person to whom that individual is identified.

1.3 Syndrome of Intermetamorphosis

The syndrome of **intermetamorphosis** was first described by Courbon and Tusque in 1932 (Ellis & Young, 1990). The patient, Sylvanie G, was 49 years of age at the time of her presentation. She had been previously admitted to hospital in February 1924. The salient feature of her presentation was that 'people around her [were] transformed physically and psychologically into other people' (Ellis, Whitley & Luaute, 1994, p. 139). She said

> They have changed my hens, they've put two old ones in the place of two young ones, they had large combs instead of small ones. . . . I have seen women change into men, young women into old men. . . . In the street in Paris a quarter of an hour apart, I saw three boys like my son. They were dressed in the same way, with the same nose, the same rosy face, the same small mouth. But not one of them was my son, because they were teasing me, laughing happily, and young girls with them. . . . My aunt I saw in two different places at the same time, as if split in two. (p. 139)

In relation to her husband, she said

> In a second my husband is taller, smaller or younger. It's the individual into whom he is transformed who lives, who is in his skin, who moves. It's as if you put yourself into his skin, it was you and not him. It was not merely a *change*, but a true *transformation* [italics in the original]: I have changed with age, but have not transformed, I am still the same person. One day he changed into young M. Panier. He took on his mannerisms and face, spoke like him. (p. 140)

She concluded, 'They change as they wish. . . . [T]he whole of society is doing it, and with such great agility' (p. 140).

Courbon and Tusques (1932) make the point that their newly described syndrome is distinct from Frégoli syndrome in that in Frégoli syndrome there is false recognition without false physical semblance, whereas in intermetamorphosis there is both false recognition and false physical resemblance (Ellis, Whitley & Luaute, 1994). To restate this more clearly, in Frégoli syndrome, the patient recognizes a familiar person in someone who is demonstrably physically different from the familiar person. By contrast, intermetamorphosis involves the recognition of and identification of a familiar person in an unfamiliar person, but the recognition and identification are based on some shared characteristics. The degree to which the shared characteristics are in fact false physical resemblances is generally not appreciated.

1.4 Syndrome of Subjective Doubles

Christodoulou (1978a) described an 18-year-old female patient presenting with the belief that a

> female neighbour had succeeded, by means of elaborate transformations, in acquiring physical characteristics identical with her own ('same face, same build, same clothes, same everything'). She believed that this woman had special make-up, a wig, and a mask and characterized this transformation as a 'metamorphosis'. (p. 250)

On a subsequent admission,

> [s]he insisted that she had seen at least two female patients transformed into her own self. She attacked one of these patients and pulled her hair. When her hypothetical double

> managed to escape from her Ms. A was agonized and begged her doctor to 'pull the mask' from the other patient's face to disclose her real identity. (p. 250)

She wrote, in a letter, to her father:

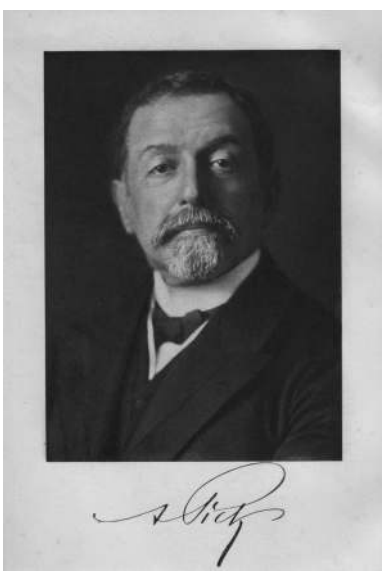
> In here there is a girl as fat and as tall as I am. At night when everyone is asleep she puts on a wig and a mask and walks from the room stealing things in order to incriminate me. One night I woke and saw her with my own eyes. It is unfortunate that due to my confusion I failed to run to the window to shout to the people, 'Look here, this is me, and this is my double with a wig and a mask.' (p. 250)

The original case of Capgras syndrome just described also presented with delusion of subjective doubles and anticipated the case described by Christodoulou. What is unclear in these cases is whether the belief is simply an abnormal belief or involves, as it seems to in this case, actual perception of the so-called doubles.

In addition, it is important, from the point of view of attempting to understand the origins of these experiences, that this patient had associated false memories of familiarity including *déjà vécu* and also depersonalizations and derealization. I will return to these issues later.

Christodoulou's case demonstrates very sharply one of the most tantalizing aspects of delusional misidentifications that is little remarked upon, namely that false physical resemblances take place. In other words, a patient can look at a physically distinct face and figure and come to the erroneous judgement that it is identical to her own face and body. The reverse is also true, that a patient can look at their own face and report significant physical changes (see the original case described by Capgras and Reboul-Lachaux discussed earlier). I emphasize this point in order to argue that these false physical resemblances or altered visual perceptions must be accounted for in any explanation of the underlying causal mechanisms.

1.5 Reduplicative Paramnesia



Arnold Pick 1851–1924

Pick (1903) described a new phenomenon that he termed reduplicative paramnesia. The case was a 67-year-old woman who was being treated in hospital in Prague. On the morning of May 24,

> she imagined she was in K., and in reply to the assistant's question how it was that he was in K. also, she said she was very pleased to see him *here too* [italics in the original]. On being questioned further how it was that the entire hospital, as well as the patients, came to be in K., she replied that the doctor had so arranged it. When examined later on, she recognized the author, but at first does not know where she is; had at first believed that she was in K., her birthplace. . . . On being asked how it was that the professor had come to K., how had the entire surroundings come there, and to the objection how could the doctors have come there? 'Why, good God! Everything can go round about and back again.' (p. 262)

In relation to additional inquiries, the patient said

> there had been a great swindle, and she had been dragged into it. . . . [S]he relate[d] that she had been in the clinic in Prague for five months; she had left there yesterday; this is a clinic, too, exactly like the one in Prague. . . . She . . . explains this is the same clinic as the former one, but at a different place. (p. 263)

In a previous case, Pick had described a man who had asserted that there were two independent clinics that were exactly alike and, in addition, that there were two professors of the same name at the head of these clinics.

Reduplicative paramnesia is treated as a subset of delusional misidentification syndromes because of the underlying notion of duplication. Generally, though, there is no associated misidentification of persons as such, except in a few cases (Patterson & Mack, 1985; Hudson & Grace, 2000b).

1.6 Classification of Delusional Misidentification Syndromes

Delusional misidentification syndromes are, strictly speaking, not syndromes at all but symptoms. As described earlier, these symptoms can occur in schizophrenia, mood disorder, delusional disorder or organic disorder such as Alzheimer's dementia (Oyebode & Sargeant, 1996). It is important to be aware of the range of other neurological and physical disorders that have been described in association with delusional misidentification syndromes such as multiple sclerosis (Sidoti & Lorusso, 2007), urinary tract infection (Salviati et al., 2013), parkinsonism (Roane et al., 1998), Parkinson's disease (Pagonabarraga et al., 2008), cortical atrophy (Joseph et al., 1999b), Alzheimer's dementia (Ismail et al., 2012; Jedidi et al., 2013), Lewy body dementia (Thaipisuttikul et al., 2013), subarachnoid haemorrhage (Bouckoms, Martuza, & Henderson, 1986) and cerebral infarction (de Pauw, Szulecka & Poltock, 1987; Jocic & Staton, 1993).

There have been repeated calls for consensus regarding terminology, definitions and classification of these conditions (de Pauw, 1994). Several authors have proposed differing classifications (Silva, Leong & Shaner, 1990; Weinstein, 1994; Roessner & Rössner, 2002). Silva et al. (1990) justify their proposed new nomenclature by arguing that the current classification is based upon the explanations given by the patients, for example, that familiar people have been replaced or are doubles. Their proposal attempts to classify at a more fundamental level based upon the notion that delusional misidentification syndromes are disorders of recognition of identities of the self and others and by structuring the classification on the degree to which the delusional belief involves beliefs about psychological or physical alterations in the target person or object of the delusional belief. This proposal fails to deal adequately with delusional beliefs involving objects or places and, in my view, ignores a more fundamental problem, which is that delusional misidentification syndromes can involve more than visual sensory objects. Perhaps more problematic, however, is the fact that in including 'subjective' Frégoli, 'reverse' intermetamorphosis and other new phenomena it is likely to unnecessarily widen the boundaries of delusional misidentifications syndromes. In any case, this radical alternative classification has not found wide usage.

Other authors have included misidentification of mirror images and television images and the so-called phantom boarder syndrome as part of the delusional misidentification syndromes (Förstl et al., 1991). Again, this approach seeks to widen the reach of these syndromes by including phenomena that do not have at their core notions of 'the double' or that are best construed in other ways. Misidentification of television and mirror images as real possibly points to loss of the capacity to distinguish between objects and their images. Some of the

misidentification of mirror images of the self relates more to prosopagnosia for familiar faces than to delusional misidentification syndromes. This issue raises the distinction between misidentification and misrecognition. The idea here is that misidentification is a conscientious misidentification of a person as someone else despite evidence to the contrary, whereas misrecognition is a common place error, to do with mistaken recognition, and does not involve conviction and inflexibility in the face of counterargument. Roessner and Rössner (2002) make the case for their own classification system based upon the distinction between the target person or object being 'altered' or 'doubled'. On the face of it, this seems to be a simplified method, but in practice it is difficult to hold in mind and to apply with ease.

More recently, clonal pluralization of self, relatives or others has been proposed as a variant of delusional misidentification syndromes in which an individual believes that there are many physical and psychological copies of a given original (Ranjan et al., 2007). Weinstein has argued for a classification system that regards the delusional misidentification disorders as determined by a belief in duplicates and hence a classification according to whether the duplication is expressed in the modalities of person, place, time and event, objects, parts of the body or self. This approach might reduce complexity (Weinstein, 1994), but it is likely to lose sight of the commonalities between Capgras phenomenon for person, place, time and events, as these would all be classified differently, and the obvious conceptual links may ultimately be lost in the noise of multiple and unrelated categories.

There is little doubt that delusional misidentification syndromes occur as a continuum from a positive pole consisting of minor forms of déjà vu experience to reduplicative paramnesia and a negative pole from depersonalization to nihilistic delusions (Sno, 1994). What is significant is that there is at present no fully satisfactory classification of delusional misidentification syndromes. Derealization and depersonalization can occur in the prodromal phase of delusional misidentification syndromes, and hence there is some case for depersonalization having an intrinsic role in the process that produces delusional misidentification syndromes (Todd, Dewhurst & Wallis, 1981b). This at least means that the argument for regarding delusional misidentification syndromes as being part of a continuum as proposed by Sno (1994) is promising as a basis for further inquiry, but the central issue is the configuration of the continuum. In Sno's scheme, he envisages positive and negative poles, with the positive pole moving from déjà vu experiences to reduplicative paramnesia and the negative pole from depersonalization to Côtard syndrome. It is unstated where in the continuum Capgras syndrome, Frégoli syndrome, syndrome of subjective doubles, syndrome of intermetamorphosis and *jamais vu* phenomenon would reside. It is also unclear what role severity would play in determining the position of a syndrome along the continuum. Nonetheless, there is merit in regarding the negative and positive poles as potential ways of understanding the underlying mechanism of misidentification syndromes.

1.7 Explanatory Hypotheses

1.7.1 Psychodynamic Explanations

Coleman (1933) argued for ambivalence as an essential psychodynamic mechanism in delusional misidentification syndromes, namely that the misidentified individual is one with whom the patient has an ambivalent relationship. A clinical example might be the case of a young woman who is physically and emotionally abused by her parents and whose response is to say, 'They can't be my parents or they wouldn't treat me like this,' and to

conclude that they must be impostors. These kinds of cases, where the erroneous belief is clearly understandable given the context, exist but are rare.

Coleman's view is shared by several other authors who also emphasize the fact that only a small number of specific individuals are misidentified, and this confirms that ambivalence is important and central to understanding why a particular individual is selected as the focus of the delusional belief (Enoch, Trethowan & Barker, 1967; Moskowitz, 1972; Vogel, 1974; Dally & Gomez, 1979). The problem with this approach is simply that it is not always obvious that the emotional relationship is marked either by ambivalence or by a negative attitude. And, in any case, delusional misidentification for objects and places for which ambivalence is far from obvious widely occurs (Moselhy & Oyebode, 1997).

Other authors have emphasized the role of splitting of internalized object representation (Berson, 1982) and regression to a phase in childhood before object constancy was established (Jackson et al., 1992) or regression to archaic forms of thinking that occurs in psychosis (Todd, Dewhurst & Wallis, 1981a) as the basic anomaly in delusional misidentification syndromes. What is clear is that these explanatory hypotheses cannot account for the range of cases seen, nor can they account for the associations with neurological lesions or impairments in face processing that have been demonstrated in delusional misidentification syndromes.

1.7.2 Neurological Explanations

Delusional misidentification syndromes have been associated with a number of neurological lesions (Moselhy & Oyebode, 1997). In a series of 29 cases, diffuse cortical atrophy and posterior fossa or subcortical abnormalities were demonstrated on computed tomographic scans, and cortical dysrhythmia and focal epileptiform discharges were reported on electroencephalogram (Joseph, 1985b). There is also substantial evidence for the role of the right (non-dominant) hemisphere in delusional misidentification syndromes (Cutting, 1991; Madoz-Gúrpide & Hillers-Rodríguez, 2010), including findings of a significantly enlarged right anterior horn region in patients with delusional misidentification syndrome in the context of Alzheimer's disease (Förstl et al., 1991) and the development of delusional misidentification syndromes following right temporoparietal infarction (de Pauw et al., 1987). In addition, in reduplicative paramnesia there is evidence of bilateral anterior cortical atrophy, subcortical atrophy and involvement of cerebellar vermis atrophy (Joseph et al., 1999b). But perhaps the most important findings are the reports of Capgras syndrome in association with interictal psychosis and infarction of the occipitotemporal junction, thereby drawing attention to the role of the occipital cortex in delusional misidentification syndromes (Lewis, 1987) and of direct involvement of the fusiform gyrus, therefore pointing to a role for the same brain areas in both delusional misidentification syndromes and prosopagnosia (Hudson & Grace, 2000a). Other investigators have shown that in Alzheimer's disease presenting with Capgras syndrome there is significant hypometabolism in orbitofrontal and cingulate regions bilaterally and in left median areas and relative hyper-metabolism in bilateral superior temporal and inferior parietal regions (Mentis et al., 1995). Indeed, Lewy body dementia, Capgras syndrome, phantom boarder syndrome and reduplication of person and place were all associated with hypoperfusion in the left hippocampus, insula, ventral striatum and bilateral inferior frontal gyri, whereas visual hallucinations of persons were associated with hypoperfusion in the left ventral occipital gyrus and bilateral parietal regions. It is probably true to say that an integrative