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What is Capgras delusion?

MAX COLTHEART AND MARTIN DAVIES

Abstract

Capgras delusion is generally defined as the belief that close relatives have been replaced by strangers. But such replacement beliefs have also been reported to occur in response to encountering an acquaintance, or the voice of a familiar person, or a pet, or some personal possession. All five scenarios involve believing something familiar has been replaced by something unfamiliar. So should these five kinds of delusional belief all count as subtypes of the same delusion – that is, should all be referred to as Capgras delusion? We argue in favour of this position.

A key finding for attempts to understand Capgras delusion is that personally familiar faces normally activate the sympathetic nervous system (SNS) much more strongly than unfamiliar stimuli, but in Capgras delusion this difference is absent, prompting the delusional idea that a familiar person is actually an unfamiliar person, a stranger. This absence of an effect of familiarity on SNS response should be observed in all of the five kinds of case described above if all are to count as occurrences of Capgras delusion.

1. Introduction

The Capgras delusion owes its name to the French psychiatrist Joseph Capgras (1873–1950) who published the first paper on this condition in 1923 (Capgras & Reboul-Lachaux, 1923; English translation by Ellis et al., 1994). That paper described the case of a 53-year-old Parisienne who believed that her husband had disappeared and been replaced by a stranger of similar appearance.[1]

Since this report, many other cases in which the deluded person believed that a family member had been replaced by a stranger of similar appearance have been reported (e.g., Brighetti et al., 2007; Thiel et al., 2014; Nuara et al., 2020). This has led some (e.g. Chang & Tsai, 2015, p. e73; Yagci & Tasdelen, 2018, p. 196) to define the Capgras delusion specifically in terms of the replacement of a family member.

However, this definition is too restrictive, because there are also many cases reported in which the person believed to have been replaced by a stranger was an *acquaintance* of the deluded person *not* a member of that person's family. For example, in the 133 cases of Capgras delusion reviewed by Berson (1983), there were many in which the persons believed to have been replaced were not family members but were instead e.g., neighbours, priests, therapists etc. These results have been confirmed by Bell et al. (2017) and Currell et al. (2019); in the cases they reviewed, though the persons believed to have been replaced were family members in the majority of instances, they also included a variety of people who were not family members: health care providers, neighbours, friends, police, and a family solicitor.

Perhaps because of such data, most definitions of Capgras delusion these days do not restrict it to the replacement of family members. For example:

> The disorder consists of the belief that a person or persons have been replaced by 'doubles' or imposters without significant changes in the physical appearance of the misidentified objects. (Cipriani et al., 2013, p. 672)
>
> Capgras syndrome, in which individuals come to adopt the delusional belief that persons well-known to them have been replaced by an impostor or a 'double'. (Fiacconi et al., 2014, p. 1)
>
> Capgras syndrome is a misidentification syndrome characterized by delusions that a familiar person has been duplicated and replaced by an imposter. (Darby & Caplan, 2016, p. 251)

The definitions above overlook one important point, though: the distinction between recognising familiar individuals by sight (i.e., by their faces) versus by sound (i.e., by their

[1] This patient exhibited many other delusional beliefs in addition to the replacement delusion concerning her husband. She believed not only that her family had been replaced by impostors, but also that this was so for her concierge, her servants, other tenants in her building – indeed, "the whole world" had been replaced. She also had many delusions that were nothing to do with replacement, including delusions of persecution and extremely detailed delusions of wealth and royal grandeur. But in many subsequently-described cases, the Capgras delusion was the only delusion evident.

voices). It has often been noted that Capgras patients who believe that some person familiar to them has been replaced by a stranger when looking at that familiar person can still correctly identify that person when hearing their voice (e.g., Hirstein & Ramachandran, 1997; Nuara et al., 2020). What is more, the opposite is seen: there are patients who believe that some person familiar to them has been replaced by a stranger when hearing that familiar person's voice but can correctly identify that person when seeing their face (Lewis et al., 2001). Furthermore, Capgras delusion for heard but unseen (because unseeable) familiar individuals has been reported in blind patients (Signer et al., 1990; Rojo et al., 1991; Dalgalarrondo et al., 2002).

Even acknowledging this distinction, perhaps the definitions we have just quoted are still too restrictive, because there are cases where the individual whom it is believed has been replaced is not a human being, but a nonhuman animal. For example, Todd et al. (1981) described a case in which a patient believed that "her much-loved Siamese cat had been replaced by an identical one" (p. 322). Other cases have been reported for pet cats (Reid et al., 1993; Darby & Caplan, 2016), pet dogs (Wright et al., 1994, Cases 1 and 2; Islam et al., 2015) and pet birds (Somerfield, 1999; Rösler et al., 2001).

Furthermore, cases have also been reported where what is believed to have been replaced is not even animate. For example, Coleman (1933) described a patient who believed that letters received from her daughters were facsimiles written by someone else. Anderson (1988) reported a case in which a patient kept records of more than three hundred items that he believed had been replaced by subtly different and inferior duplicates. Young et al. (1994) described a case in which a patient "claimed that furniture in his house had been 'replaced' by exact replicas, consistent with an inanimate Capgras-like delusion" (p. 137). Other such replacement delusions have been reported for medications (Edelstyn et al., 1996), a patient's paintings and cypress trees in the patient's garden (Islam et al., 2015) and even a complete home (Darby et al., 2017). In the review by Berson (1983), a few of the replacement delusions involved inanimate objects. In a more recent review of 255 cases, Pandis et al. (2019) found that the delusion concerned inanimate objects in 43 cases (17%).

Thus there are a number of different kinds of delusional belief involving replacement, differing with respect to the kinds of item that the beliefs are about:

(a) Family members identified by their faces;
(b) Acquaintances (who are not family members) identified by their faces;
(c) Family members or acquaintances identified by their voices;
(d) Animals;
(e) Personal possessions.

Should we think of these as five different delusions, or as five manifestations of the same delusion? One might favour the "same delusion" answer for the reason that a single *description* applies equally to all five: they all take the form of believing that something familiar has been replaced by something that is unfamiliar but has the same, or very similar, perceptual properties. As Anderson (1988, p. 696) put it "Phenomenologically, the delusional replacement of objects is identical to delusional replacement of people."

But if it turned out that the *explanations* of the five kinds of delusional belief were different (despite their shared generic description), we would not want to regard them as five subtypes of the same delusion.

So we will proceed here by first provisionally adopting a broad definition of Capgras delusion – based on the generic description – and then considering that definition *as a hypothesis* (Colaço, in press). The broad definition, understood in that way, identifies as targets for research not only the five kinds of delusional belief about replacement that we have discussed, but also other delusional beliefs that may be found to meet the broad definition. For each target phenomenon, research questions concern what properties cluster together with the properties mentioned in the definition, what generalisations are true, and, especially, what mechanisms (intact or damaged) explain the phenomenon. The overarching question is whether these five forms of replacement delusion have a common explanation. Colaço (in press) describes this research project as *kinding in progress*. Here, *kinding* is the investigation of whether different phenomena belong to the same natural kind; and it remains *in progress* because further phenomena – as yet undiscovered or unexplained – might be found to fit the broad definition.

1.1 Some delusions about persons: Replacement, misidentification and reduplication
Here are some beliefs different delusional patients have expressed concerning their spouses:

> (a) When looking at the spouse: "That is not my spouse. My husband has been replaced by a stranger who is impersonating my husband" (see Enoch, 1963, Case 7).
>
> (b) When looking at the spouse: "That is not my spouse, it is another person I know – she was once my business partner" (see Breen et al., 2002)
>
> (c) "I have two families of identical composition including two identical wives" (see Alexander et al., 1979).

The three types of delusional belief illustrated above are sometimes all considered to be examples of the same delusional condition, which is usually termed "Delusional Misidentification Syndrome" (DMS). That is a confusion for several reasons.

One reason is that no one has ever claimed that there is some single common cause for the three types of delusion – no single theory that can explain all three – and indeed it is hard to imagine that any such theory could ever be devised. Why, in that case, should these three delusional beliefs be given the same name?

Another reason is that only one of these three types of delusional belief actually involves misidentification. To misidentify X is to assign an identity to X which is not X's identity, but *the identity of something else, Y,* as in the definition and examples of usage in the *Oxford English Dictionary*:

> **Misidentify** Identify (something or someone) incorrectly
> *False positives are cases where legitimate messages are misidentified as spam.*

… *such as misidentifying one species for another.*[2]

That is what happens in example (b) above, so that type of delusion is correctly referred to as delusional *misidentification*. But in case (a) there is no misidentification because the patient is saying, "I cannot identify this person I am looking at"; nor is there misidentification in case (c) because when the patient is confronted with the spouse and asked to identify that person, they respond correctly: "That is my spouse".

Failure to distinguish these three distinct types of delusional belief is widespread in the literature on delusion. Many examples could be given; we will just point out one. The title of the paper by Alexander et al. (1979) is "Capgras syndrome: A reduplicative phenomenon" – but no reduplication is involved in believing one's spouse to have been replaced by a stranger. The stranger is not being claimed to be a duplicate of the wife: that is a different delusional belief (it is type (c) above).

We are concerned here only with the delusional belief that something familiar has been replaced by something unfamiliar, and that is how we understand Capgras delusion. We are not concerned here with the (different) delusional belief that something familiar has been replaced by some other familiar thing (we call that delusional misidentification). Nor are we concerned here with the (different again) delusional belief that two identical versions of something familiar exist (we call that delusional reduplication). Delusional misidentification and delusional reduplication are of great interest and deserve explanation, but neither is directly relevant to our paper.

2. How is the Capgras delusion to be explained?

Early attempts at explaining the Capgras delusion were psychodynamic in nature, but more recently neuropsychological explanations of the Capgras delusion have been proposed – for example:

> I suggest that the Capgras delusion results from lesions of the pathway for visual recognition at a stage where visual images are imbued with affective familiarity. This results in familiar images evoking unfamiliar and incongruous affective responses and such inconsistency is then rationalised by the interpretation that the image cannot be that which it physically resembles. (Anderson, 1988, p. 698)

Ellis et al. (1997, p. 1086) noted that a prediction from Anderson's *disconnection hypothesis* concerning the cause of Capgras delusion was that people with Capgras delusion will not show the strong affective responses to familiar faces that nondeluded people show. They set out to test this prediction, measuring affective responsivity to familiar and unfamiliar faces via a response which indexes the activity of the sympathetic nervous system (SNS), namely, the skin conductance response (SCR). They found that while familiar faces evoked larger SCRs than unfamiliar faces in healthy controls and in nondelusional psychiatric cases, this was not the case for a group of five patients with Capgras delusion. For the deluded patients, SCRs to faces were no larger when the faces were familiar than when they were not, confirming the

[2] https://www.lexico.com/definition/misidentify

prediction from Anderson's hypothesis. This critical finding has been confirmed by Hirstein and Ramachandran (1997), Brighetti et al. (2007) and Bobes et al. (2016).

It is assumed that this absence of SNS response has phenomenological consequences. As Marshall (1998, p. 651) put it:

> It is known that Capgras patients fail to show a galvanic skin response to familiar faces. This loss of emotional reaction to previously loved ones leads the patient, it has been claimed, to interpret the lack of an appropriate 'warm glow' as evidence that an imposter is pretending to be the vanished original.

This finding invites an obviously plausible answer to the question "What initially prompts the delusional idea in Capgras delusion?" If familiar faces normally evoke a strong response of the SNS, this is something that people will learn in the course of everyday life. Hence whenever they recognize a face as familiar, they will expect a strong SNS response to ensue. Suppose one day this does not happen when a familiar person is encountered, because, as hypothesised by Anderson (1988), there has been neuropsychological disconnection of an intact face recognition system from an intact SNS. How will the person who experiences this unexpected event explain it? Given that absence of a strong SNS response is characteristic of seeing the face of someone unfamiliar, if the apparently familiar person were actually a stranger then that would explain the unexpected event. Ellis et al. (1997) and others have proposed that it is this reasoning which initially gives rise to the idea in Capgras patients that the person who has just been encountered is not a familiar individual, but some stranger (who looks very like the familiar individual).

3. Five kinds of delusional belief concerning replacement of the familiar by the unfamiliar: Do they have a common explanation?

Earlier we distinguished five kinds of delusional belief involving replacement. Two involved people's faces: the faces of family members and the faces of acquaintances who are not family members. Given that both types of stimuli evoke larger SCRs than the faces of strangers (Brighetti et al., 2007; Bonifacci et al., 2015), the account we offered above of what prompts the delusional Capgras idea is applicable for both of these kinds of delusional belief.

Many studies (e.g., Ellis et al., 1997) have shown that famous faces also evoke larger SCRs than the faces of strangers. One might wonder, then, why there have been no reports (as far as we know) of Capgras delusion where the replaced person was someone famous, rather than someone personally known to the deluded individual. Perhaps the SNS response to familiar people is weaker when they are famous rather than personally familiar (Herzmann et al., 2004; Vico et al., 2010) and so its unexpected absence will be less noticeable.[3] Anderson (1988) proposed the following hypothesis about *selectivity*:

[3] The idea that the familiarity effect is weaker for famous faces could explain why a difference in SCRs between famous and unfamiliar faces has not always been found when faces of loved ones have been included in the same study (e.g., Vico et al., 2010).

> It will be confrontation with the most familiar and important objects in one's world that will produce the greatest awareness of incongruity between the appreciation of an object and the affective familiarity it normally stimulates. (Anderson, 1988, p. 698)

We also mentioned a third kind of delusion, involving people identified by their voices rather than by their faces. One might suppose here that Capgras for voices arises as a consequence of neuropsychological disconnection of an intact *voice* recognition system from an intact SNS. That suggestion predicts that in patients with Capgras for voices, SCRs to familiar voices will not be larger than SCRs to unfamiliar voices, a finding reported by Lewis et al. (2001). In their patient HL, with Capgras for her son's voice but not for his face, SCRs to familiar faces were larger than SCRs to unfamiliar faces but there was no SCR difference between familiar and unfamiliar voices.

Thus for three of the five kinds of delusional belief involving replacement that we discussed earlier, there is reason to believe that some modality-specific system for recognition (either face recognition or voice recognition) is failing to activate the SNS as it should when a familiar stimulus is presented, and it is this which prompts the delusional idea that the familiar person whose face is seen or whose voice is heard is a stranger.

What about the other two kinds of delusional belief?

3.1 Capgras delusion for animals and objects

Livestock farmers can identify by sight individual members of their flocks of sheep or herds of cattle (Bornstein et al., 1969; Damasio, 1985, p. 134; McNeil & Warrington, 1993, patient WJ). Thus it would seem that some farmers acquire a visual individual-animal-recognition system and that if individual animals are both familiar and important to a farmer then recognition of an animal will be accompanied by strong SNS activity. This conjecture could be evaluated by measuring farmers' SCRs[4] to the faces of individual cows or sheep that are personally familiar to them and comparing them with SCRs to unfamiliar animals. If there were farmers with delusional beliefs about replacement of individual animals then we could predict that their SCRs would not differentiate between familiar and unfamiliar animals.

Whether or not there are cases of replacement delusions for farm animals, it seems plausible to conjecture that a scenario like that described above occurs with pet owners. If an individual cat, say, can be distinguished from unfamiliar cats by the pet owner and recognized as the owner's personal pet cat, that pet owner must have acquired a visual individual-cat-recognition system including a representation of that individual cat, and activation of that representation by an encounter with the pet will activate the SNS. If so, and if subsequently a neuropsychological disconnection of that system from the SNS occurs, the pet will now evoke small or no SCRs (as would happen with unfamiliar cats), which could explain how replacement delusions for pets occur. This conjecture could be evaluated by measuring pet owners' SCRs.

The same ideas apply to personal possessions. Is it the case that, for example, very familiar personally-possessed items of furniture evoke strong SCRs compared to unfamiliar items of

[4] Or any other index of SNS activity such as pupil size or heart rate.

furniture? And is that SCR difference abolished in cases like that of Young et al. (1994), whose patient "claimed that furniture in his house had been 'replaced' by exact replicas, consistent with an inanimate Capgras-like delusion"?

In sum, then, we propose the following general answer to the question of what causes the delusional idea of replacement of the familiar by the unfamiliar to come to mind. Whenever an object has become familiar – that is, has become recognisable as an individual – this is because a representation of that object has become established in an appropriate recognition system. Activation of any such representation in a recognition system activates the SNS, so the SNS will respond strongly when any familiar object is encountered (compared to when an object is unfamiliar i.e., is not represented in an individual-recognition system). People will learn to expect this SNS response to familiar objects. So any substantial departure from this expectation – for example, if a disconnection between a recognition system and the SNS has occurred and a personally familiar item (person, animal or personal possession) is encountered – may prompt the delusional idea that the item is a stranger of some sort, which would explain the unexpected absence of a SNS response.

If future research finds that this explanation applies to all five of the replacement delusions we have discussed, that would support the broad definition of Capgras delusion, considered as a hypothesis (Colaço, in press). In that case, we should agree with Anderson's (1988) *generality* hypothesis:

> Although it is repeatedly claimed that the Capgras delusion is specific for people, particularly those emotionally closest to the patient, the literature clearly shows this is not the case. … [T]he Capgras delusion is not specific for people, but can include a range of objects of importance in the patient's life. (1988, pp. 696, 698)

We have argued here[5] that unexpected lack of a strong SNS response to a familiar object is sufficient to account for the *generation* of a delusional idea or hypothesis about replacement. We have also argued that such a lack, while causally implicated in the generation of the replacement hypothesis, is not sufficient to explain why that hypothesis is adopted and maintained as a belief. Thus, a *second factor* must be present if a delusional belief is to result from the lack of a strong SNS response to a familiar stimulus (the first factor).

[5] Following Ellis and Young (1990, p. 244): "One may extend this argument to other [delusions]. Places, objects, etc., are not affectively neutral and so the absence of an emotionally charged input could produce the feeling of recognition but of it not being quite right. … This would be particularly true for those places and objects with which the patient is most familiar."

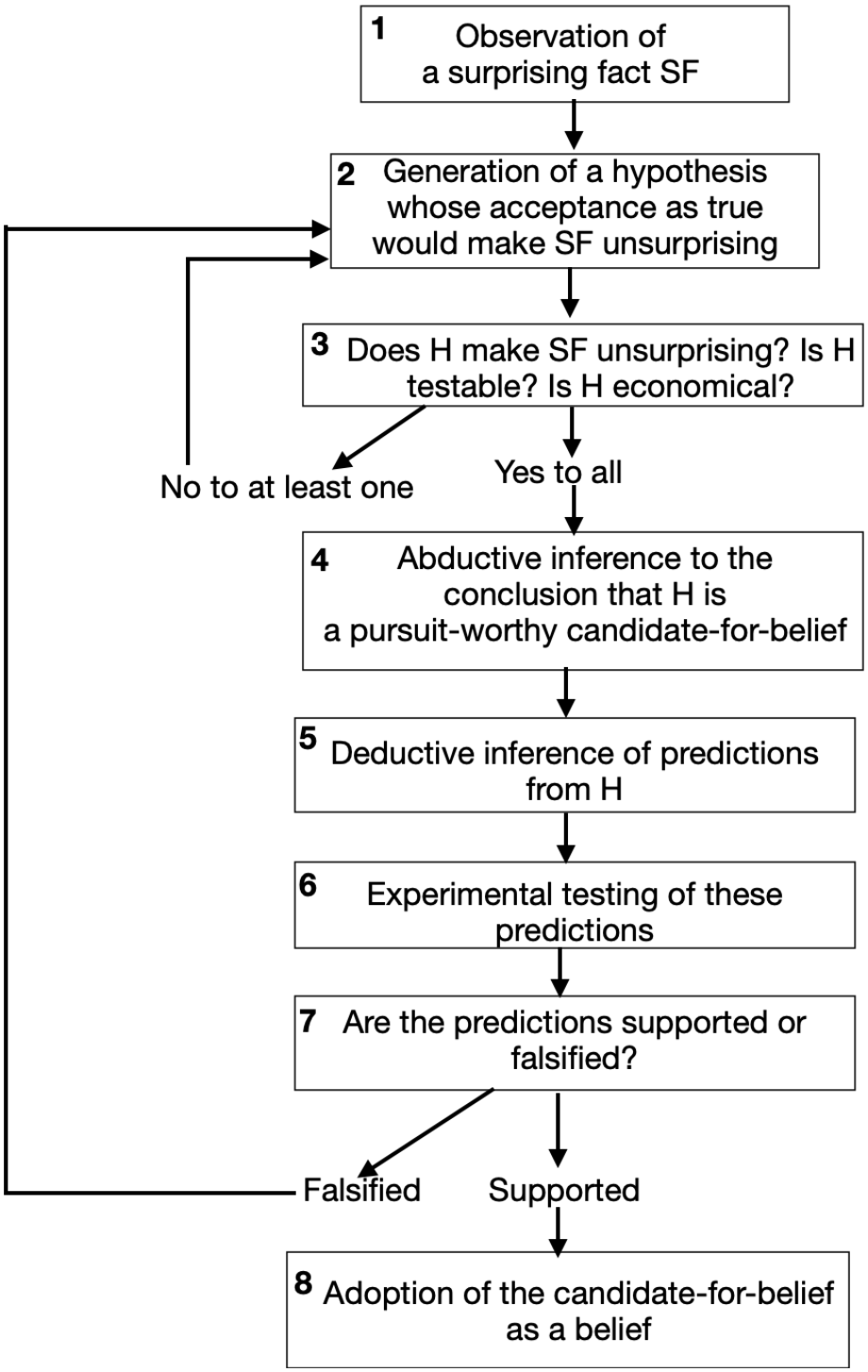

Figure 1: An 8-step model of the adoption of a new belief in response to the observation of a surprising fact (Coltheart & Davies, 2021a, 2021b; Davies & Coltheart, 2020)

4. The second factor in Capgras delusion

Accounts of the two-factor theory of delusional belief (Davies et al., 2001; Coltheart, 2007; Coltheart et al., 2011; Coltheart & Davies, 2021b) argue that to understand any delusion answers to two questions need to be obtained. The first question is: What initially prompts the delusional idea? The second question is: Why is this idea adopted and maintained as a belief rather than being rejected, as it should be? The content of the delusion is determined by the answer to the first question, and so this answer will vary from delusion to delusion. In contrast, the answer to the second question is the same for all delusions: it is a failure of hypothesis evaluation.

Coltheart and Davies (2021a) have proposed an eight-step model of the processes (including hypothesis generation and hypothesis evaluation) by which unexpected observations give rise to new beliefs. Figure 1 depicts this model. Coltheart and Davies (2021b) have provided evidence and argument that the defect of hypothesis evaluation in cases of delusion is specifically a defect at the seventh step in that model, this step being the confirmation or falsification of predictions derived from the hypothesis that putatively explains the unexpected observation.

4.1 The argument for a second factor

A general strategy adopted by two-factor theorists has been to identify some first factor that is plausibly responsible for the content of the delusional belief in question and then to show that there are patients for whom that first factor is present but who are nevertheless not delusional. If that can be done, it can be argued that the first factor, though causally involved in the delusion, is *not sufficient* for the delusion to occur: there must in addition be a second factor involved. Coltheart and Davies (2021b, Table 1) spelled out this argument by proposing first factors for six delusional conditions and then, for each of these first factors, noting reports where the first factor is present but there is no delusion – which in each case implies the need for a second factor to explain that particular delusion.

We argued above that the first factor in Capgras delusion for a person recognised by their face is a failure of the expected strong SNS responsivity to the faces of familiar people. So pursuing the reasoning outlined in the previous paragraph requires one to find cases where strong SNS responsivity to the faces of familiar people is absent and yet there is no delusion concerning these people.

Tranel et al. (1995) describe such cases. They studied four patients with bilateral ventromedial frontal damage (lesions involving the ventral and mesial sections of the orbital cortices, and the lower sector of the mesial frontal region). Explicit face recognition and SCRs were tested with three types of familiar faces:

- faces of family members and close acquaintances;
- faces of famous politicians or actors; and
- faces of people that the patients had only come to know after the onset of their condition (e.g., their clinicians).

Face recognition was essentially normal (98.5%, 97%, and 94% correct) but for all three types of familiar face, SCRs were no larger than they were to the faces of strangers. In contrast, five

patients with occipitotemporal lesions showed much larger SCRs to familiar faces than to unfamiliar faces.

The absence of differential SCRs to the faces of familiar people in the ventromedial patients did not result from failure of the face recognition system in these patients (since their identification of faces was almost perfect). Nor was it due to general SNS hyporeactivity (since these patients produced SCRs to physical stimuli such as a loud noise or a deep breath). Tranel and colleagues ascribed these findings to a disconnection between the face recognition system and the SNS:

> signals aimed at frontal cortices … can no longer activate the destroyed ventromedial region … . The triggering of central autonomic control nuclei from the ventromedial frontal cortices would be precluded, and electrodermal skin responses would not occur in response to the types of stimuli used in these experiments. (Tranel et al., 1995, pp. 430–431)

This is the disconnection hypothesis proposed by Anderson (1988) and empirically confirmed by Ellis et al. (1997) and others, as discussed above.

Critically, none of the ventromedial patients were delusional, even though all of them failed to show larger SNS activation to any of the three types of familiar face than to unfamiliar faces. It follows that, as the two-factor account of Capgras delusion argues, this failure of SNS activation to familiar faces is not sufficient to generate the Capgras delusion, which implies that some second factor must also be present if this failure of SNS activation is to result in Capgras delusion.

Tranel et al. (1995) did not mention any other regions of brain damage in their four ventromedial patients, but the same four patients are discussed in more detail by Tranel and Damasio (1994). Table 4 of that paper reports lesion data for the four patients.[6] Three of them had partial lesions of some regions of the right dorsolateral prefrontal cortex (rDLPFC), with some regions of rDLPFC spared; for the fourth patient, rDLPFC was entirely spared.

The reason that this is relevant is that it has been argued by two-factor theorists that rDLPFC is a brain region involved in hypothesis evaluation, and that the demonstrations of damage to rDLPFC that have often been reported in patients with Capgras delusion are consistent with the view that these patients do have impaired hypothesis evaluation (see e.g., Coltheart et al., 2018 for a review of this evidence).

If rDLPFC was not fully intact in three of these four ventromedial patients then why – it might be asked – was the second factor (impairment of hypothesis evaluation) not present? Why were the patients not delusional? An initial response to this question is to point out that rDLPFC is an extensive region of the brain, implicated in many cognitive functions. It cannot be assumed that partial damage in that region will inevitably impair all of those functions. Further work is required to achieve a finer-grained understanding of the specific neural basis of the processes involved in hypothesis evaluation. In any case, our main point remains.

[6] We thank Philip Corlett for drawing our attention to this point, and also thank him and Daniel Tranel for discussions of these four patients.

Abnormally weak SNS responsivity to familiar stimuli is not sufficient by itself to cause Capgras delusion, so a second factor does need to be invoked.

Furthermore, this argument is not restricted to Capgras delusion; it has been advanced for a variety of delusional conditions. Table 1 of Coltheart and Davies (2021b) provides examples, for six delusional conditions, of patients in whom the first factor is present but who are not delusional, implying for each delusion that a second factor needs to be postulated to explain the presence of delusion.

In this paper, we have adopted the broad definition of Capgras delusion as a hypothesis and our working assumption is that replacement delusions for people, pets and possessions have a common explanation. Thus, we are committed to the view that the second factor is present in people exhibiting any of the subtypes of Capgras delusion (that is, any of the five replacement delusions). If impairment of hypothesis evaluation reflects damage to rDLPFC, then those people should exhibit such damage. If the impairment of hypothesis evaluation seen in delusional people takes the specific form of "a failure to reject (or at least downgrade) disconfirmed hypotheses" (Coltheart & Davies, 2021b, p. 222) then those people should exhibit that kind of failure.

5. Conclusions

Capgras delusion is sometimes defined as the belief that a close relative (e.g., the spouse) of the deluded person has been replaced by a stranger of similar visual appearance. There are, however, numerous reports of delusional beliefs about replacement of a familiar individual (identified by their face) who is not a relative, or a familiar individual (identified by their voice), or a pet, or a personal possession, by an unfamiliar person, animal or object of similar visual appearance (or similar sounding voice).

Drawing on the important early work of Anderson (1988) and adopting the methodology of Colaço (in press), we suggest that these five kinds of delusional belief should all be counted as subtypes of Capgras delusion. First, all five are encompassed by a single broad definition, based on the generic description: believing that something familiar has been replaced by something unfamiliar but similar. Second, if all five are to be subtypes of a single delusion then they should share a common explanation. We have proposed that, in each case, the delusional idea or hypothesis would be evoked in the same way, as follows:

(1) a personally familiar item (person, animal or object) is encountered;
(2) its recognition as familiar is expected to evoke a strong SNS response, because that is what normally occurs when a personally familiar item is encountered and recognised;
(3) but, as happens when strangers or other personally *un*familiar items are encountered, there is no strong SNS response;
(4) this mismatch between what is expected and what actually happens is the first factor in our account of the Capgras delusion. The mismatch evokes the delusional idea that the item is in fact unfamiliar – a stranger of some sort – despite appearances.
(5) This delusional idea, which ought to be rejected, is instead adopted and maintained as a belief because of the presence of the second factor (impaired hypothesis evaluation).

This account of how replacement delusions concerning livestock, pets and personal possessions arise or could arise is speculative, but we have indicated how it can be tested in future research. If other delusional beliefs are found to fit the same broad description then the question will arise whether the common explanation extends to them as well.

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