The Problem of the unwanted prediction: Anomalous experience reconsidered

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Abstract

Brendan Maher maintains that an anomalous experience is both necessary and sufficient for a subject to adopt a delusion. This one-factor line has been countered by two-factor theorists who argue that whether or not an anomalous experience is necessary for delusion an anomalous experience cannot be sufficient. Various candidates have been proposed for the second factor. Davies et al. suggested that the delusional error may be in accepting a faulty perception to be veridical when there is rational grounds to doubt its veridicality. This account of what is going wrong implies what Davies et al. refer to as an 'unwanted prediction' where we would expect delusional subjects to accept their perception as veridical in the case of visual illusion. I would like to maintain that if the anomalous experience is viewed as affective rather than perceptual, then the unwanted prediction would no longer be implied by Davies et al's *account. Visual illusions may simply be the wrong kind of anomalous experience to result in delusion. If there is a mechanism responsible for generating a familiarity response then it may also be plausible that the content of the anomalous experience is enough to have the delusional subject insist that the person is unfamiliar to them.*

1 Defining delusion and kinds of delusional utterance

What is a delusion? The clinicians handbook the *Diagnostic and Statistical Manual of Mental Disorders defines delusion* as:

> [A] False belief based on incorrect inference about external reality that is firmly sustained despite what almost everyone else believes and despite what constitutes incontrovertible and obvious proof or evidence to the contrary. The belief is not one ordinarily accepted by other members of the person's culture or subculture...' (American Psychiatric Association, (2000) pp. 821-822).

There is much controversy surrounding this definition and whether delusions must be: False, beliefs, incorrect inferences, regarding external reality, firmly sustained, and so forth. In short we may question this definition on every substantial point that it makes. Despite this controversy the DSM would seem to provide the best definition that we have at present, though there is ongoing research into devising a definition that may more accurately capture what is distinctive about delusion.

While there is ongoing debate about the definition of delusion, there is general agreement as to which kinds of utterance are appropriately classified as expressing delusions. The following are fairly standard examples, and I shall focus on the first two types.

Type of delusion	**Delusional utterance**
Capgras	'My wife has been replaced by an impostor'
Frégoli	'People I know are disguising themselves and are following me around'
Thought insertion	'Someone else's thoughts are being inserted into my mind.'
Alien control	'Someone else is controlling my actions'.

Table 1: Types of delusions and examples of delusional utterance.

2 From one to two factors in the explanation of delusion

While delusions have historically been considered to be paradigmatic of irrationality, the psychological theorist Brendan Maher (1999; 2003) counters that delusions are 'not an example of disordered thinking but of normal adaptive thinking applied to explain very abnormal experiences' (2003 p.19). He maintains that an anomalous experience of a certain intensity and duration is both necessary and sufficient for a subject to adopt a delusional belief. The nature of the anomalous experience is thought to be such that the subject is compelled to attempt to explain it. Maher considers that delusions are the inevitable result of such an attempt at explanation. He concurs with Reed's claim that

> [G]iven the necessary information, the observer can empathize with the subject; if he himself were to have such an unusual experience he would express beliefs about it which would be just as unusual as those of the subject... They can occur in anybody who experiences disturbing phenomena, while retaining the ability to think clearly enough to be able to devise explanations of those phenomena (in Maher, 1999 p. 551).

Two-factor theorists depart from Maher by considering that delusions would not seem to be 'normal' or 'rational' responses - despite the nature of the delusional subject's experience. Davies et al., (2002 pp. 136-137) present a battery of eight different types of delusion and they suggest that a prospective

account should be assessed for adequacy with respect to how well it can explain each of these types. They argue that it would seem plausible that the anomalous experience that is relevant to each of these kinds of delusion is one that is experienced by both delusional and non-delusional subjects. They thus consider that regardless of whether an anomalous experience is necessary for delusion, it cannot be sufficient. As such they consider that Maher's account of the role of anomalous experience needs to be supplemented by a second factor. It is this second factor that determines whether a subject will develop a delusion in the face of an anomalous experience.

3 From perception to belief: The problem of the unwanted prediction

After considering problems with several attempts to characterize the nature of the second factor Davies et al. (2002 p. 149) maintain that the second factor may be described as 'a loss of the ability to reject a candidate for belief on the grounds of its implausibility and its inconsistency with everything else that the patient knows'. They then consider that 'attempts to say in more detail what this loss of ability amounts to face many problems' (2002 p. 149). They note that typically normal subjects believe what they perceive and they call this tendency a pre-potent doxastic response. Non-delusional subjects are thought to be able to inhibit this response when what they perceive diverges too radically from prior perceptions or beliefs. Delusional subjects, on the other hand, are thought to develop delusions because they are unable to inhibit this response in the face of an erroneous perceptual experience (Davies et al., 2002 p.153). This line is similar to one interpretation of Stone and Young's suggestion that the delusional error is that the subject favors observational adequacy over conservativeness, or accepts bottom-up (perceptual) information over top-down (rationally considered) evidence (1997 p. 349).

Davies et al, (2002 p. 152) consider that a difficulty with their account of the nature of the second factor - and this is a difficulty that would seem to apply to Stone and Young's account also - is that they run up against what Davies et al. refer to as an 'unwanted' prediction. A visual illusion (such as the Muller-Lyer illusion, or the Ames room) would provide an erroneous visual perception for the delusional subject. On Davies et al.'s and on Stone and Young's account of the nature of the second factor the delusional subject would be expected to accept this erroneous percept despite any rational evidence to the contrary (such as after measuring the lines, or seeing the arrow heads removed and then reinserted). Davies et al. would seem correct in

considering this prediction to be implausible, although it should be said that it has not been empirically tested.

I would like to suggest that we may be able to avoid the unwanted prediction by suitably refining the kind of anomalous experience that is relevant to the production of delusion. If visual illusions do not produce the relevant kind of anomalous experience then it would not count against the two-factor account if a delusional subject did not accept an illusory percept to be veridical. A reconsideration of the nature of the anomalous experience can avoid the unwanted prediction currently implied by Davies et al.'s two-factor account, but moreover it can be seen to bring us closer to Maher's line on the sufficiency of certain kinds of anomalous experience for the production of delusion.

4 Physiological findings and delusions of misidentification

The Capgras and Frégoli delusions are different kinds of delusions of misidentification. In the Capgras delusion the subject seems to be mis-identifying someone they were previously close to such as a husband, wife, or child by maintaining that they have been replaced by an impostor, robot, or clone. In the Frégoli delusion the subject would seem to be mis-identifying strangers for people who are familiar to them when they maintain that people they know are disguising themselves as strangers and are following them around. It would seem plausible to consider that delusions of mis-identification may arise from a difficulty with processing perceptual information that would normally enable subjects to recognize people they know.

Interestingly, it has been found that subjects who have developed the Capgras delusion in response to cerebral trauma do process information regarding faces who are familiar to them differently from non-delusional controls, though perhaps in an unexpected way. While non-delusional subjects produce a heightened skin galvanization response to familiar faces as opposed to the faces of strangers, subjects with the Capgras delusion have been found to lack such a response, or to display a response that is significantly diminished (Bruyer, 1991; Young and de Haan, 1992 and Young, 1994 in Stone and Young, 1997 p. 337).

Subjects with the neurological condition of prosopagnosia have been found to display the usual heightened skin galvanization response to familiar faces. They are able to report that the faces seem familiar to them as normal subjects do, but they are unable to identify the face, or recall biographical

information pertaining to the face that they have been shown. Ellis and Young (1990) consider these findings to provide some support for their thesis that there are two dissociable pathways involved in face recognition; a perceptual pathway, and an affective one. They maintain that these two pathways should be a part of a cognitive model of face recognition and they also consider these pathways to be realized in the brain on the dorsal and ventral routes. Breen et al., (2000) have critiqued the notion that the two cognitive pathways are realized on the dorsal and ventral routes, but they also maintain that the dual mode cognitive model could be realized on a single neural pathway. This does not seem to disrupt the cognitive model of face recognition; it just calls into question issues around how the model is realized on the neural wetware of the brain.

Ellis and Young (1990) link the perceptual pathway to the subject's ability to recall and verbalize information pertaining to the face of the person they have been shown, such as biographical information, and the person's name. This is the pathway that is damaged in subjects with prosopagnosia. Ellis and Young, (1990) do not explicitly consider the function of the affective pathway, except to postulate that its malfunction is responsible for the production of the anomalous experience that features in the Capgras delusion.

It still needs to be explained how such a lack of normal affective response to familiar faces is relevant to an explanation of the Capgras delusion. Although normal subjects are not typically aware of producing a heightened skin galvanization response to familiar faces and not to strangers it is thought that the lack of normal response would trigger consciously experienced 'alarm bells' that would serve to signal to the subject that something is wrong. It would seem plausible to consider that prior to head injury the delusional subject would have produced the greatest affective response to people who were close to them such as a wife, husband, or child. Post head trauma the difference between the response that should have occurred and the response that does occur would thus be the most anomalous for their loved ones. These findings would also seem relevant to an explanation of the Frégoli delusion if, for example, it was found that subjects with this delusion produced a heightened skin galvanization response to strangers. While this has not been empirically tested it would seem to be a plausible hypothesis in light of the findings of the physiological responses of subjects with the Capgras delusion. If it was found that subjects with the Frégoli delusion do produce a heightened response to at least some strangers then this would seem to go some of the way towards explaining why they judge that strangers are people who are familiar to them.

5 The nature of anomalous experience

Davies et al. (2002, p. 143) firstly consider that the nature of the relevant anomalous experience may be an 'unusual experience of faces or a sense that "something is different" as a result of flattened affective responses'. If the content of the anomalous experience was this general then it would be hard to see why people would be compelled to adopt the Capgras delusion in response to this. There does not seem to be anything intrinsic to the nature of the anomalous experience to determine that the subject must develop a delusion in the face of such an experience, and there would seem to be non- delusional alternatives. As such Davies et al. would seem to be correct in considering that a second factor must be required in addition to the anomalous experience to account for why some subjects develop delusions in the face of such an experience while others do not.

Maher is primarily interested in enumerating the kinds of anomalous experience that are relevant to the explanation of schizophrenic delusions, rather than explaining the delusions of misidentification that typically arise from cerebral trauma that are the focus of Davies et al.'s battery. He does, however, state that:

> [D]elusional interpretations of circumscribed anomalies of experience arising from psychopathology are not confined to schizophrenia...[T]he model of delusion formation... posits that the basic origin lies in the anomalous experience, regardless of how that anomaly arose (Maher 1999, p.566).

As such, we should expect that his account would be capable of explaining each of the delusions presented in Davies et al's battery. Maher explicitly considers six kinds of schizophrenic anomalous experience while acknowledging that there might be others. The one that would seem most relevant to an explanation of the Capgras delusion is considered to be 'feelings of non-recognition' which consists in 'Unrecognized defects in the sensory system... or the endogenous activation or inhibition of the central neural representations of sensory input' (Maher, 1999 pp. 553-554). Maher does not explicitly consider Ellis and Young's model of face recognition, and the possible implications of the physiological findings for the nature of the experience of subjects who develop the Capgras delusion in response to cerebral trauma, though to be fair he is more focused on accounting for schizophrenic delusions.

Maher considers that the crucial difference between delusional and non-delusional subjects is that while a non-delusional subject may have fleeting

or transitory anomalous experiences these are comparatively shallow compared with the intensity and duration of the delusional subject's anomalous experience. Maher's appeal to intensity and duration has come under fire by theorists who maintain that appeals to intensity and duration are problematic. It would be preferable to have some independent measure of the difference between delusional and non-delusional anomalous experience.

6 Experiential content and the content of the Capgras delusion

The content of the Capgras delusion is much disputed. Campbell (2002 p. 90) attempts to radically translate the content of this delusion, and he ends up concluding that one cannot attribute a content to the delusional subject's utterances. His argument for this comes from the work of Donald Davidson on radical interpretation, and W.V.O. Quine on radical translation. Campbell maintains that in order to attribute a content to the delusional subject's utterances we must presuppose that the subject is rational. He maintains that the best interpretation of the Capgras delusion is 'that [currently perceived] woman is not that [remembered] woman' (Campbell, 2002 p. 90). He then considers:

> How would you go about verifying such a judgment? You would have to check that the woman you currently perceive is indeed the one of whom you have all those memories. The canonical way to do this would be to find out whether you have shared memories of the events in which you both took part. And the canonical way to do that would be to discuss those past events... Since the patient does not use this way of checking who it is that is before him, he seems to have lost his grasp of the meaning of the word (Campbell, 2002 pp. 90-91).

Campbell seems to be thinking that meaning, or content is determined by its functional role. As the delusional subject does not behave in a manner that one would expect given his interpretation of the content of the delusional belief, he maintains that here there is no content that we can attribute that is both based on standard meanings of the terms, and that makes the subject out to be rational. We may wonder whether functional definitions of content are too excessively holistic so that one change in belief would alter too much of the rest of the subject's belief network. Campbell, however, is led to conclude that delusional utterances do not express contentful states.

I do not wish to be detained by this line of criticism too much here. At present I shall just note Bayne and Pacharie's points that the delusional subject can use the words with which they express their delusional utterance appropriately in other contexts, and they also seem to be making a genuine attempt to communicate beliefs (2004, p. 9). What is relevant about Campbell's line, however, is the notion that the content of delusional utterances may be interpreted or translated. Often utterances can be ambiguous and Campbell alerts us to the possibility that there may be an ambiguity with respect to what the delusional subject is saying.

The content of the experience of subjects with the Capgras delusion might be a general feeling that something is different, as Davies et al. firstly consider, though in this case we would seem to need something of a story as to why the delusion is focused solely on the replacement of certain individuals.

The way in which we spell out the content of the delusional utterance and the way in which we spell out the content of the anomalous experience affects how big the step is between the content of the experience and the content of the belief. If the content of the experience is a vague or general experience of dissonance then it would indeed seem that a second factor would be required to determine that the subject arrives at a delusional belief.

Davies et al. (2002 pp. 150-151) then go on to consider that the rather than a general sort of anomalous experience that they outlined earlier,

> Suppose, on the other hand, that the patient's unusual experience represents the situation as follows: "This is someone who looks just like my close relative *but is not really her/him.*" If the delusional hypothesis is already part of the *representational content* of the patient's perception, then the route to a delusional belief involves nothing more than accepting the perception as veridical.

In regarding the anomalous experience that is relevant to the Capgras delusion to be a perceptual experience they are led to the problem of the unwanted prediction.

7 A familiarity mechanism

I have already mentioned that Ellis and Young (1990) consider the anomalous experience to arise from a breakdown of the affective pathway. They do not explicitly consider the function of this pathway except to maintain that its breakdown results in the anomalous experience that is relevant to the

Capgras delusion. I would like to suggest, however, that the function of the affective pathway may be a low level face recognition system. It may be plausible to think that there would be an evolutionary advantage to being able to quickly recognize whether people are familiar or strangers. We would be at an advantage if we had a low level system that could monitor for threat potential so that we could relax when the people around us are familiar and are unlikely to pose a threat.

There would also seem to be a benefit in taking such a system to be fairly low level so as to function unconsciously as attentional and cognitive resources would be freed up for alternative activities. If this is plausible then we may have an independent reason to posit a fast, low level, primitive face recognition system that delivers its result in physiological responses. If this mechanism were to be faulty or defective then the content of the delusional experience may be the richer content 'this person is unfamiliar to me'. If it is indeed a low level system then this may also go some way towards explaining why it is that the delusional subject cannot just ignore the message that the person is a stranger despite others trying to argue them out of their delusion. The mechanism may not be able to be brought under the conscious control of the subject, or learning how to consciously inhibit the response may take some time.

The anomalous experience of subjects with the Capgras delusion occurs reliably whenever the subject experiences the face of their loved one, and aside from this anomalous experience the delusional subject may well have normal experiences. This may account for the finding that some subjects with the Capgras delusion do not have any other delusional beliefs, and why they have the particular variety of delusion that they do. The anomalous experience signals that something is wrong, but more than that, it may function to signal just what is wrong; namely that a person with whom they have close dealings is not known to them.

8 Perceptual versus experiential anomalous experience

While Davies et al. characterize the nature of the anomalous experience as a perceptual experience it would seem that the anomalous experience relevant to an explanation of the Capgras delusion is not so much a faulty perceptual experience – as in prosopagnosia – so much as one that arises from a disconnection between perception and affective response.

If the relevant anomalous experience for the Capgras delusion has the content 'that person is unfamiliar to me' then there is no reason to suppose that subjects with this delusion should be taken in by visual illusions such as the Muller-Lyer illusion. If the content of the Frégoli delusion is 'familiar people are following me around' then it would likewise seem that we would not expect them to be taken in by visual illusion. If there is a mechanism capable of producing an experience of unfamiliarity then delusions would seem to be the inevitable result of certain breakdowns or malfunctions in this mechanism.

Hohwy & Rosenberg (forthcoming) maintain that instead of intensity and duration being the crucial difference between delusional and non-delusional subjects delusions are a function of the recurrence of the anomalous experience in the face of no alternative ways to reality test. Typically we can reality test the information provided by one sensory modality with information provided by another sensory modality. We can check things we hear with what we can see, and what we can see with what we can touch. They consider that the nature of the anomalous experience of delusional subjects is one that is not able to be tested by any alternative sense modality. In the case of the Capgras delusion, for example, the lack of affective response may be considered to provide information that is not duplicated by any other available mechanism. It may be plausible to consider that the evolutionary advantage of monitoring for strangers and possible threat potential may result in the affective response system taking priority over the remaining perceptual pathway.

If the content of the anomalous experience is so rich then delusions may not be inferences that are called on to explain why it is that the subject has such an anomalous experience, as Maher maintained. Rather the delusional subject may be trying to do one of two things: They may be falsely reporting on the way that things are in the world by accepting certain kinds of affective responses to be veridical (whether or not they have rational grounds to doubt) or alternatively, they may be attempting to express their anomalous experience. If delusional subjects are indeed expressing the nature of their anomalous experience then it may be that the evidence that is typically offered against the delusion misses the point somewhat.

It is as Walkup notes:

> The distinction between a description of the experience (sometimes called a phenomenological description) and the description of the factual state of affairs is scientifically and clinically important. Scientifically, a subject who consistently failed to describe

> the perception of certain illusions would be suspected of some visual or neurological abnormality. Clinically, the therapist who challenges a patient's description of his or her experience may sound absurd, just as would a vision researcher who insisted to an experimental subject that the two lines in the Muller-Lyer illusion actually look the same length (Walkup, 1995 p. 326).

If, on the other hand, delusional subjects are falsely reporting on the way that things are in the world by accepting certain kinds of anomalous experience to be veridical then this still may not constitute a two-factor account of delusions if the delusional subject is using reasoning processes that are comparable to the reasoning processes of non-delusional subjects to arrive at their delusional belief. If Hohwy and Rosenberg's point is accepted that the subject is unable to reality test with a mechanism that duplicated the information provided by the familiarity mechanism then it would not seem that delusional subjects have rational grounds to doubt that the person in front of them is unfamiliar to them. As such there would seem to be a single factor, that of a certain kind of anomalous experience that is both necessary and sufficient for a subject to arrive at a delusional belief.

9 Concluding remarks

The following table is a specification of the kind of anomalous experience that may be relevant to four of the eight delusions that feature in Davies *et al's* battery. If this analysis of the content of the delusional experience is accepted and we consider that the subject is making false claims about the world then it would seem that we do not need to appeal to cognitive bias and / or deficit to account for the kinds of delusional utterances that are characteristic of these delusions.

Type of delusion	**Delusional utterance**
Capgras	This person is unfamiliar to me
Frégoli	This person is familiar to me
Thought insertion	That wasn't my thought
Alien control	That wasn't my action

Table 2: Types of delusions and examples of delusional utterance.

If it is granted that there can be a fairly specific experiential content then it would seem be plausible that delusion is an inevitable result of having such an experience. The content of the delusion may be given by the nature of the

experience if, for example, the content of the Capgras subjects experience is that 'this person is not familiar to me'. If this is the correct delineation of the content of the anomalous experience then subjects would be expected to respond by countering the claims that others make regarding the identity of the person with denials and statements that are characteristic of the Capgras delusion. If, on the other hand the content of the delusional experience is a general or vague experience of dissonance, or notification that some 'unspecified element has changed', as Maher explicates the content of the anomalous experience and as Davies et al., firstly take it to be, then delusion would not seem to be an inevitable result of that sort of experience. In this case there would not seem to be any intrinsic feature of the anomalous experience that would determine that the subject must offer a delusional explanation for it.

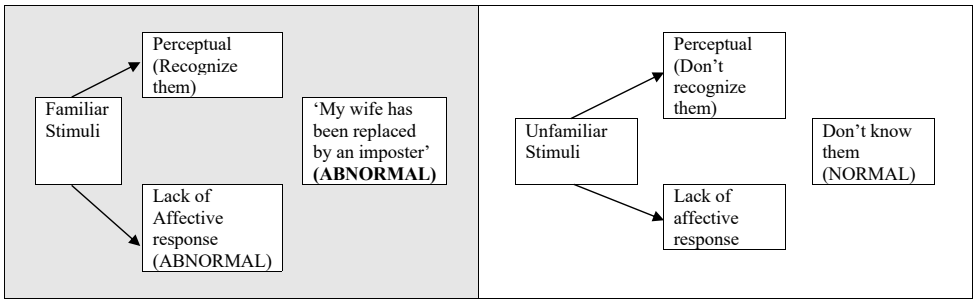
Davies *et al.,* use the counter-examples as an argument to establish that a second factor must be required to determine that the subject adopts a delusional explanation for their anomalous experience. They also acknowledge, however, that one could simply object to their counter-examples by maintaining that the experience of the delusional subjects is different from the experience of non-delusional subjects. It would seem, however, that such examples provide a challenge to the line that anomalous experience is sufficient for delusion and the burden is placed on one-factor theorists to specify in more detail the nature of the anomalous experience that is supposed to be sufficient for delusion.

In this paper I have attempted to argue that it may well be plausible to pack a fairly rich content into the delusional subjects' anomalous experiences, and that that rich content may make it inevitable that delusion is the result of such experiences. Even if one does not accept that anomalous experience is sufficient for delusion, such a line on the content of the experience is able to avoid the unwanted prediction that Davies et al., note. It would seem that not just any erroneous perception is enough to produce delusion; rather it is a certain kind of anomalous experience that is required. In the case of delusions of misidentification (namely Capgras and Frégoli) the relevant experience would seem to be a disconnection between perception and affective response. In delusions of control (namely thought insertion and alien control) such an experience would seem to arise from a disconnection or discrepancy between intention and response (as argued in Chapter 2 of my Thesis). These disconnections produce an anomalous experience for the subject, and they are unable to use a properly functioning mechanism to 'reality test' as the only available mechanism is faulty / defective. Whether or not one considers delusions to be inevitable given the kind of anomalous experience I have out-

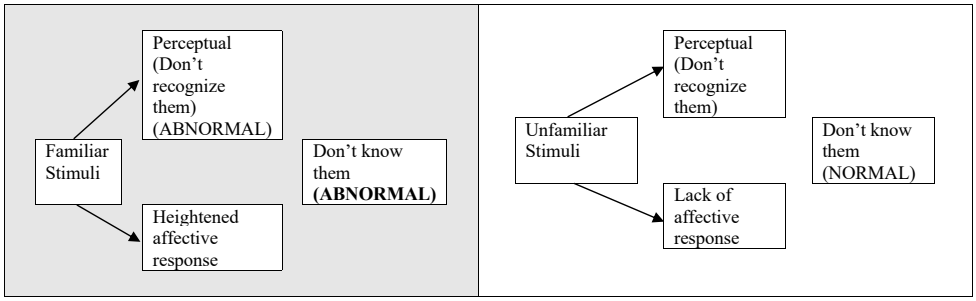
lined, it would seem that such a specification of the anomalous experience would rule out visual illusions as the sort of anomalous experience that is relevant to the production of delusion.

Cognitive Models of Capgras, Prosopagnosia, and Frégoli

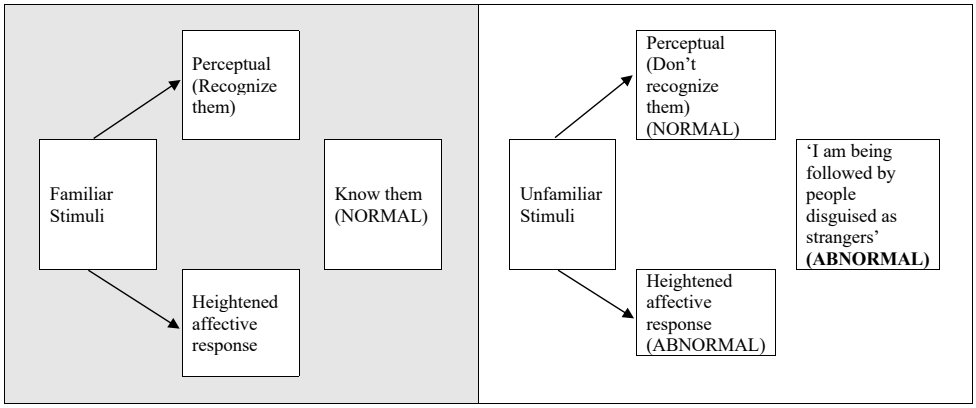
Capgras



Prosopagnosia



Frégoli



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