

## Hypnosis and Conversion Hysteria: A Unifying Model

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There are many similarities between the symptoms of conversion hysteria and phenomena produced in hypnotic contexts. This paper reviews some of those similarities and considers more general features associated with both hypnotic phenomena and conversion hysteria symptoms such as lack of concern, perceived involuntariness, the display of “implicit knowledge” and their apparently compliant nature. Neurophysiological and brain-imaging studies of hypnotically produced effects and conversion symptoms are described, which implicate frontal cortical structures in moderating the respective changes elsewhere in the brain, particularly in cingulate cortex. A recurrent theme is the apparent paradox which exists between, on the one hand, the subjective reality and involuntariness of both hypnotic phenomena and the symptoms of conversion hysteria and, on the other, the fact that objectively they appear to be role-congruent enactments responsive to the manipulation of motivational factors, expectancy, and social influence. A model of consciousness and self-awareness is presented which attempts to resolve that paradox whilst describing similar mechanisms underlying hypnotic phenomena and conversion hysteria symptoms. The model develops the idea of a central executive structure, similar to the notion of a supervisory attentional system, acting outside self-awareness but at a late stage of information processing which can be directly influenced from both internal and external sources to produce the relevant phenomena. The paper ends by proposing that as *conversion disorder*, *pain disorder*, and the *dissociation disorders* appear to be linked by a common mechanism they should be classified together under the heading of *auto-suggestive disorder*.

### INTRODUCTION

... the literature on hypnosis is replete with the induction of phenomena which, if they occurred spontaneously or were generated by the patient without the encouragement of a hypnotist, would immediately be classed as hysterical...

(Merskey, 1995, p. 265)

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It has long been recognised that hypnotic procedures can induce symptoms similar to those seen in hysteria (e.g. Gilles de la Tourette, 1887) and the link between hysteria and some form of suggestibility was enshrined in Babinski's term *pithiatisme* (a condition due to "persuasion"), which he offered as an alternative to hysteria (Babinski & Froment, 1918). This paper explores these parallels between hypnotic and hysterical phenomena a little further for the subset of hysterical symptoms typical of conversion disorder as described in DSM-IV (APA, 1994) and goes on to suggest that the similarities may reflect common underlying mechanisms. The latter are then described in the form of a neuropsychological model.

### A Comparison of Conversion Disorder Symptoms and Specific Effects of Hypnotic Procedures

*Motor Symptoms or Motor Deficits.* Conversion disorder symptoms in this category include impaired co-ordination or balance, paralysis or local weakness, difficulty swallowing, aphonia, and urinary retention. Not all of these symptoms are traditionally suggested in hypnosis settings and so are not commonly observed, though there is every possibility that they could all be replicated hypnotically. Some, however, particularly motor paralyses, are commonplace in hypnosis and include the inability to bend an arm, to rise out of a chair or to speak one's own name. As in conversion disorder, the effects produced in hypnosis are "pseudoneurological". A "paralysis", for example, may involve an inability to perform a particular movement or to move an entire body part, rather than corresponding to patterns of known motor innervation. In conversion disorders it is primarily the negative motor symptoms which are identified, whereas in hypnosis there is an equal emphasis on the production of positive motor phenomena, such as arm levitation.

*Sensory Symptoms or Sensory Deficits.* Typical conversion symptoms here include loss of touch or pain sensation, double vision, blindness, deafness, and hallucinations. Again, a striking feature of these symptoms, which is shared with the corresponding hypnotic phenomena, is that they defy the normal rules of neuroanatomy and neurophysiology. Both conversion anaesthesia and hypnotically suggested anaesthesia of a hand for example will typically show a glove pattern with sharply defined boundaries in apparent correspondence to a naïve understanding of sensory innervation patterns. With hypnosis, the boundaries may be further circumscribed by suggestion with anaesthesia limited to an area defined by a circle traced on the palm of the subject's hand (e.g. Wilton, Barnier, & McConkey, 1997).

In contrast to conversion disorder, there is no obvious predisposition in hypnosis settings towards negative sensory effects and it is equally common to suggest positive sensory phenomena. The latter may range from simple changes,

such as hand warming, to hallucinations involving all sensory modalities, including complex scenarios, age regressions, and the like which have an "as real" quality. In hypnosis too it is possible to produce the positive sensation of pain in specified anatomical locations and with particular sensory attributes. In terms of the view being presented here I would wish to include *pain disorder*, which is classified separately in DSM-IV within the somatoform disorders, as an example of positive sensory symptoms alongside the rest of the conversion symptoms. Interestingly, there is some evidence that chronic pain patients show greater capacity for responding to suggestions in hypnotic contexts (hypnotisability) than the general population (Crawford, Knebel, & Vendemia, 1998).

*Seizures or Convulsions.* Within the conversion disorders this subtype includes seizures or convulsions with voluntary motor or sensory components. There is a large neurological literature on nonepileptic, seizure-like behaviours which have been variously labelled "psychogenic seizures", "hysterical seizures", "pseudoseizures", "nonepileptic attack disorder", "nonepileptic seizures", and "psychogenic nonepileptic seizures" (e.g. Betts & Boden, 1991; Goldstein 1997; Kuyk, Liejten, Meinardi, Spinhoven, & Van Dyck, 1997). Some of these categorisations are intended to include seizure activity with other organic causes and cases where brain epileptiform activity is triggered by psychological factors, as well as behaviours and sensations associated with panic attacks and hyperventilation. Others more clearly relate to what are being classified here as conversion seizures. The latter are more common in females and are involuntary convulsive episodes, which are often hard to distinguish from epileptic seizures but are not accompanied by the typical brain discharge.

Perhaps not surprisingly, there appears to be no nonclinical literature relating to the intentional induction of seizures with hypnosis though there are some relevant clinical studies. Schwartz, Bickford, and Rasmussen (1955) reported that, in contrast to epileptic seizure patients, they were able to both initiate and stop seizures in nonepileptic seizure patients using direct hypnotic suggestions. There is also evidence that nonepileptic seizures, dissociation, and hypnotisability are related (e.g. Kuyk et al., 1995; Kuyk, Van Dyck, & Spinhoven, 1966), although Litwin and Cardena (1993) failed to find similar high levels of hypnotisability in their pseudo-epileptic seizure patients.

## More General Similarities between Hypnosis and Conversion Hysteria

*Lack of Concern over Symptoms or Effects.* One interesting parallel is the fact that individuals experiencing both conversion symptoms and hypnotic phenomena may display a striking composure about what is happening to them. In hysteria, *la belle indifférence* shown by many patients to their symptoms has long been recognised and is still regarded by some as a diagnostic feature of the



condition (e.g. Seligman & Rosenhan, 1998) though others have stressed its variable incidence (Merskey, 1995; Sackeim, Nordlie, & Gur, 1979). In hypnosis also, it is predominantly the case that, although they may recognise the discrepancy between reality and the suggested hypnotic effects, subjects experiencing a phenomenon, such as arm levitation or eyelid catalepsy, express interest, surprise, and mild amusement at these experiences rather than the anxiety, concern, and fear which might be expected if these or similar changes occurred in other contexts.

*Involuntariness.* A further common feature is the subjective "involuntariness" of both hysteria symptoms and hypnotic phenomena. This point was neatly encapsulated many years ago for hysterics by Paget (1873) who commented: "They say, 'I cannot'; it looks like 'I will not'; but it is 'I cannot will' ". Similarly for hypnotic subjects a defining feature of hypnotic responses, particularly where movement or inhibition of movement is concerned, is the feeling of involuntariness which accompanies them (Kirsch & Lynn, 1995, 1998; Woody & Farvolden, 1998).

*Apparent Malingering and the Display of "Implicit Knowledge".* The feeling of involuntariness in hypnosis and hysteria makes the relevant phenomena subjectively "real" to the subject or patient, although an onlooker may gain the impression that they are the products of outright faking or malingering (Sackeim et al., 1979), especially when there is evidence that physiologically the effects are anything but "real" (see Kihlstrom, 1994; Pincus & Tucker, 1985). In the case of both hysterical and hypnotic paralysis, for example, there is commonly no evidence of abnormal muscle tone and when the patient attempts to move the "paralysed" limb a classic observation is that both agonist and antagonist muscles contract (Kihlstrom, 1994; Yealland, 1918). Moreover, the individual's performance may display characteristics which could only be present if the symptoms did not exist. They reveal what Kihlstrom (1994) refers to as "implicit knowledge". Hysterically deaf individuals, for example, raise their voices when their speech is masked by white noise and hysterically blind individuals show nystagmus when faced with a vertically striped rotating drum (Pincus & Tucker, 1985). Similarly, subjects made hypnotically blind in one eye are subject to perceptual illusions which could only be effective if they have good vision in both eyes (Underwood, 1960) and hypnotically deaf subjects not only respond to the verbal command "now you can hear again" but their speech is disrupted by delayed auditory feedback just as it is in nonhypnotised subjects (Barber & Calverly, 1964).

Hysterically blind individuals are conventionally held not to walk dangerously into the path of oncoming cars or to hurt themselves tripping over furniture (Seligman & Rosenham, 1998). In a similar way, hypnotic subjects

who are capable of negative hallucinations will walk forward and make a detour to avoid a (real) wastepaper basket which they believe has been removed, and which they claim not to see. Conversely, with positive hallucinations hypnotic subjects are able to describe a handkerchief on the back of a chair in front of them even when it is supposedly obscured by their (hallucinated) friend. In the hypnosis literature phenomena such as these where the individual seems to be able to entertain two conflicting percepts have been cited as examples of "trance logic" (Orne, 1959), although this has not passed without criticism (de Groot & Gwynn, 1989; Spanos, 1996).

*The Influence of Motivation.* In a further demonstration of implicit knowledge, hysterically blind individuals under high motivational conditions tend to do worse on visual discrimination tasks than would be expected by chance (Bryant & McConkey, 1989; Grosz & Zimmerman, 1956, 1970; Sackeim et al., 1979). Moreover, in the Grosz and Zimmerman (1965) study the patient's performance rose to chance level when the patient overheard a confederate of the experimenters say (p. 259) "the doctors reckon that the patient can see because he makes fewer correct responses by chance than a blind man would make". Despite the change in performance this patient reported no change in his experience of blindness. In contrast, under less highly motivated conditions hysterically blind patients, like those with visual cortical lesions who display "blindsight" (Weiskrantz, 1997), tend to show completely accurate performance on visual discrimination tasks whilst maintaining their professions of blindness and having no insight into the basis for their accurate visual performance (Sackeim et al., 1979).

A similar pattern of results was obtained by Sackeim et al. (1979) with two highly hypnotisable subjects who were able to achieve apparently complete hypnotic blindness. For one of these subjects, a high level of motivation was introduced by repeated reminders that the success of the experiment relied on the subject being blind throughout. The second subject was simply told that she should do her best to comply with the relevant suggestions. The experimental task involved the presentation of line drawings of happy or sad faces and the subject was required to "guess" which of the two emotions was depicted. The subject with the high motivation instructions performed at below chance level. The second subject produced a 100% accurate performance, although she believed her performance was around 60% accuracy and was based solely on "guesswork". She said she could "sense" the emotion on the unseen face ("Well it feels like a happy face") and believed she based her guesses on this. When the actual outcome was revealed to her the subject expressed surprise and maintained that her blindness had been total throughout the experiment, in fact she claimed that for much of the time she had had her eyes closed. The parallels between the data from this second subject and that from blindsight patients are again striking (Weiskrantz, 1997).

*High Level Processing and the Influence of Social Factors.* The studies on both hysterical and hypnotic blindness indicate that the mechanisms responsible for producing them operate at a fairly high level (or late stage) of processing. There is apparently a great deal of post-perceptual processing of visual information taking place with perhaps only the final stage of entering the relevant information into subjective awareness missing. The fact that in other studies words presented to subjects during hypnotic blindness can be shown to have a priming effect in subsequent word-stem completion tasks is also consistent with this view (Bryant & McConkey, 1995). There is also evidence in the studies reviewed so far that an individual's performance while subjectively blind is affected by social and motivational factors. These influences have received a great deal of attention in hypnosis research (e.g. Spanos, 1996; Spanos & Coe, 1992) and the techniques developed could equally be applied in studies of conversion hysteria symptoms.

Nonepileptic seizures also show general similarities to hypnotically produced phenomena in their apparent responsiveness to suggestion, social norms, and pressures. Nonepileptic seizures tend to vary from convulsion to convulsion, may involve "dramatic noise, thrashing of limbs and movement" (Betts & Boden, 1991) and result in injuries such as "carpet burns" which are less commonly seen in epileptic seizures (Trimble, 1998). The overall picture is one in which the individual appears to be engaged in a motivated but involuntary enactment of a seizure or other convulsive activity. The enactment itself seems to be influenced by commonly held beliefs about such phenomena, by what they may have observed in others, or, in the case of epileptics, to how their own seizures have been described to them.

*Laterality Effects.* As a final observation on this topic of similarities, conversion symptoms of hysteria are more commonly reported on the left side than the right (DSM-IV; APA, 1994) and it is worth noting that some hypnotic phenomena, such as the differential blood flow in limbs which is associated with suggestions for differential temperature changes, also appear to be more readily produced in the nondominant limb (e.g. McGuirk, Fitzgerald, Friedmann, Oakley, & Salmon, 1998).

*Common Psychological Mechanisms in Hypnosis and Hysteria?* The fact that there are a number of specific and more general similarities between the phenomena of hypnosis and the symptoms of hysteria is consistent with a view that they might depend on similar underlying mechanisms. This view is further supported by the significant positive correlations which have been reported between hypnotisability and both hysteria generally (Briquet syndrome) and the presence of major conversion symptoms in clinical populations (Bliss, 1986). Also, as mentioned in the previous section, unusually high levels of



hypnotisability have been reported in chronic pain (Crawford et al., 1998) and in nonepileptic seizure patients (Kuyk et al., 1995, 1996).

## Neurophysiological Evidence

If we ignore the hysterical patients' and the hypnotic subjects' own declarations of involuntariness in relation to the symptoms and phenomena they experience, much of what has been said so far points to the view that these effects are somehow "unreal" products of a form of perverse role-playing or faking. However, there is one further set of evidence which it is important to consider here which by contrast points to the neuropsychological "reality" of the phenomena seen in hysteria and hypnosis.

*A Neuropsychophysiological Model of Hypnotic Susceptibility.* On the basis of neuropsychological and neurophysiological studies Gruzelier (1998) has described a model of the brain changes which occur with hypnotisable subjects during traditional hypnotic induction procedures. In brief, this consists of an initial activation of a thalamocortical attentional network, which brings into play a left frontolimbic focused attention control system. This stage typically corresponds to the subject's initial visual fixation on an object and listening to the hypnotist's voice. Subsequent suggestions of tiredness at fixation, eye closure, and relaxation accompany second stage of the hypnotic induction in which the activation of frontolimbic inhibitory systems serves to suppress anterior executive functions. It is proposed that this change leads to the suspension of reality testing and critical evaluation and corresponds to the handing over of executive and planning functions to the hypnotist. The third stage, through relaxed, passive, dream-like imagery, entails the involvement of right-sided temporoposterior functions: a process which is facilitated by simplifying the verbal content of the induction message and by emphasising past experience and emotion.

In contrast, low susceptibles (or low hypnotisables) faced with an hypnotic induction procedure either fail to show engagement of left frontal attentional control mechanisms, or if there is focal attentional engagement, fail to undergo the second, inhibitory process. Overall, low susceptibles are characterised as having poorer attentional functions outside hypnosis, although in hypnosis they show improvements as the induction progresses. High susceptibles, on the other hand, are seen as having efficient frontal attentional systems with no evidence of right hemisphericity outside hypnosis, but with more focalised, lateralised changes once an induction procedure is initiated.

*Hypnotisability and Suggestion.* Set in the context of the model outlined in the previous section, hypnotic susceptibility (hypnotisability) reflects the degree to which an individual possesses a capacity for focused attention (and

disattention to extraneous stimuli), flexibility in switching cognitive styles appropriately, and implicates frontal cortical systems in the underlying neurological changes (so-called F-bias, see Oakley & Frاسquilho, 1998). This particular set of cognitive capacities then enables the individual to respond to explicit or implicit suggestions of sensory and motor changes with congruent experiences which have a quality of involuntariness to them. The appropriate shift in attentional and information-processing style, and the accompanying responsiveness to suggestion, is presumed to be facilitated by hypnotic induction procedures. However, as it is well known that hypnotic phenomena can be produced by appropriate suggestion without formal induction procedures in susceptible individuals (high hypnotisables) it is clear that these procedures are not essential and the underlying changes may occur spontaneously.

*Brain Changes associated with Hypnotic Analgesia.* Another recent review paper by Crawford et al. (1998) has drawn on neurophysiological research using EEG, event-related potential, and regional cerebral blood flow measurements to investigate brain changes in high hypnotisables who display hypnotic analgesia. These studies are primarily in the context of experimentally induced pain, in both chronic pain patients and nonpatient groups. Although hypnotic analgesia is outside voluntary control Crawford et al. (1998) propose it is dependent on the active involvement of inhibitory processes originating in a "supervisory attention, control system" based in anterior frontal cortex, which serves to coordinate other cortical and subcortical systems in the allocation of thalamocortical activities. Regional cerebral blood flow measures, for example, in high hypnotisables during successful analgesia show bilateral activation of frontal regions, which is interpreted as evidence of increased inhibitory processing via the frontal cortical supervisory attentional system. Also, somatosensory event-related potentials (SERPs) are reported to be reduced in midfrontal, central, and parietal regions during hypnotic analgesia and reduced responses in anterior cingulate cortex have been seen during successful reports of reduced pain perception to noxious electrical stimulation.

The latter observation has been confirmed by Rainville, Duncan, Price, Carter, and Bushnell (1997) who used hypnotic suggestion in a positron emission tomography (PET) brain imaging study to increase and to decrease pain affect (unpleasantness) produced by hand immersion in "painfully hot" water without changing the perceived intensity or quality of the pain sensations. The suggestions of increased and decreased unpleasantness were counter-balanced across subjects (eight high hypnotisables), and produced the relevant subjective changes. The induction of hypnosis itself had no effect on the areas activated by painful heat—anterior cingulate cortex, rostral insula and somatosensory cortex SI and SII. However, when changes in the subjective unpleasantness of the heat stimulus were suggested, directly related brain changes were seen, but only in anterior cingulate. The authors claim that



although previous work has implicated anterior cingulate cortex in pain and emotions, this is the first *direct* demonstration of a specific encoding of pain unpleasantness in anterior cingulate cortex.

*Brain Processes during Auditory Hallucinations.* Also using PET imaging, Szechtman, Woody, Bowers, and Nahmias (1998) compared the pattern of brain activation during real, imagined, and hallucinated auditory stimulation. They used highly hypnotisable individuals who had a capacity to hallucinate and in hypnosis either presented them with a real auditory stimulus (a taped message), asked them to imagine this message as clearly as they could or told them they would hear the message, activated the click on the recorder but played no message. In the latter condition the hallucinators reported hearing the recorded message clearly. Activity was seen in an area of the right anterior cingulate cortex (Brodmann area 32) when they heard a real message and when they hallucinated it but not when they imagined it. A matched control group of high hypnotisables who were not able to hallucinate did not show the same pattern of activations and it was concluded that in the hallucinators the cingulate activation identified the auditory representations as external, erroneously so in the hallucinated message condition. These observations again suggest that the hallucinated experience was physiologically different than that produced by conscious imagining and had important features in common with experiencing the real stimulus.

*Brain Processes in Hysterical Paralysis.* In another functional imaging study, this time involving a conversion disorder, Marshall, Halligan, Fink, Wade, and Frackowiak (1997) investigated a woman with a left-sided paralysis. Preparing to move her "paralysed" left leg produced a pattern of activation of left lateral premotor cortex and the cerebellar hemispheres bilaterally similar to that seen when preparing to move the nonparalysed right leg. The authors interpreted this as evidence of a "genuine" preparation to move the paralysed leg. Attempting an actual movement of her left leg was also associated with the activation of normal movement-related areas including the left dorsolateral prefrontal cortex and the cerebellar hemispheres bilaterally. However, the normal activation of right premotor areas and right primary sensorimotor cortex was missing. There was also in this condition activation of right anterior cingulate cortex and right orbitofrontal cortex which was not seen under any other circumstances, including the control condition of attempting to move her restrained right leg. This pattern of results for the paralysed leg was taken first as "evidence against faking" and second to indicate that in view of the downstream activation of the cerebellum the lack of motor cortical activation is selective and specific. They proposed that the role of the right anterior cingulate cortex and right orbitofrontal cortex is that of active inhibition of movement of the left leg. They speculated that the originator of this

"unconscious inhibition" might be the orbitofrontal cortex with the anterior cingulate acting to disconnect the premotor/prefrontal areas from primary motor cortex. The conclude that "it is the will to move that triggers the hemiparalysis via the pathological activation of orbito-frontal and cingulate cortex". In support of greater generality to the pattern of findings in this study to other conditions they note that Tiihonen, Kuikka, Viinamäki, Lehtonen, & Partanen (1995) found simultaneous activation of frontal inhibitory areas and inhibition of the somatosensory cortex in a patient with psychogenic paresthesia.

*Common Brain Mechanisms in Hypnosis and Hysteria?* Overall, although as yet few in number, the foregoing studies indicate that there are clear functional neurological changes which accompany both hypnotically suggested phenomena and the symptoms of conversion hysteria. The fact that there are some similarities seen between brain patterns during hypnotic phenomena and conversion symptoms is consistent with, but does not prove, common neuropsychological mechanism for the two. Nevertheless, one clear prediction of the current view is that the same patterns of brain activity should be seen when hypnotically produced effects are compared to the corresponding conversion symptom. It would be a relatively simple matter for example to replicate the paralysis described in the Marshall et al. (1997) study by direct suggestion in hypnosis and it would be interesting to see if a similar pattern of brain activity emerged. A major advantage in using hypnosis in this way is that appropriate "symptoms" can be selectively created and removed for comparison with their conversion counterparts.

## Hypnosis/Hysteria Differences

The account so far has centred on the many similarities which exist between hypnotic phenomena and the symptoms of hysteria. There are, of course, some important differences (Kirsch, 1990). A major one is that hypnotic subjects actively cooperate in the procedures that produce hypnotic phenomena, whereas the symptoms of hysteria are not usually attributed by the individual to an interaction in which they were an intentional party. The suggestions that produce hypnotic phenomena similarly are classically administered by another individual, or intentionally by the individual themselves in the case of self-hypnosis. This is not so obviously the case in hysteria, although some examples have been given earlier, whereby external suggestions can alter the nature of the symptoms and there are a number of examples where suggestive techniques have been used successfully to treat conversion symptoms (e.g. Davies & Wagstaff, 1991; Kirsch, 1990; McCue & McCue, 1988; Moene, Hoogduin, & van Dyck, 1998; Sackeim et al., 1979; Schreiber, 1961; Udolf, 1987). It is assumed here that the mechanisms that produce hypnotic effects and the symptoms of conversion hysteria are the same but that the source of suggestions

in hysteria lies primarily within the internal dynamics of the individual and/or in implicit societal and interindividual pressures (as has been suggested by Oakley & Frاسquilho, 1998, for similar effects underlying body image changes in eating disorders).

A further important difference is that hypnotic phenomena are conventionally short-lived and are contained within the hypnotic context (e.g. Barnier & McConkey, 1998), whereas conversion symptoms are usually of much longer duration. This difference again may reflect differences in the motivations and expectations, both implicit and explicit, which underlie the two sets of phenomena rather than implying any significant difference in the mechanisms which produce them (Kirsch, 1990). A final difference is that symptoms of hysteria have a well established association both with neurophysiologically confirmed epilepsy and with organic brain damage (Merskey, 1995; Thornton, 1976; Veith, 1965) whereas the ability to experience hypnotic phenomena does not. It remains unclear, however, after much debate in the literature to what extent the correlation between brain damage and hysteria can be seen as implying a causal relationship. One possibility is that the linkage is in some cases a product of modelling based on existing organic symptoms, as was suggested earlier in connection with pseudo-epileptic seizures. Alternatively, it may be that some forms of cerebral dysfunction affect processes of attention or the relationship between brain systems which facilitate the development of conversion symptoms, which in themselves have a non-neurological appearance and origin. The evidence reviewed earlier and the fact that conversion hysteria shows strong social and cultural trends (e.g. Merskey, 1995) favours a functional interpretation and this is the view which will be adopted later, although the model which will be presented could be developed to incorporate organic factors.

## The Hypnosis/Hysteria Paradox

*The Paradox Itself.* A major problem in attempting to understand both the various phenomena of hypnosis and the equally varied symptoms of conversion hysteria is that both present us with an apparent paradox:

On the one hand, they both involve very powerful subjective changes which appear to be experienced with the sort of involuntariness which suggests a form of mental dissociation. Also, they are associated with apparently distinctive changes in brain activity which suggest they are genuinely unwilled phenomena.

On the other hand, they only occur if they are either implicitly or explicitly suggested. They are not truly spontaneous and are influenced by motivation, expectations, and situational demands. They can be plausibly described as role-plays or "strategic enactments", that is, they have at first sight the appearance of being deliberately created to please a hypnotist or an experimenter or to be a product of malingering to deceive a clinician.



*The State/Non-state Debate.* In hypnosis theory and research the view expressed in the first half of the foregoing paradox has been focused on by "state theorists", and that contained in the second half has been adopted by "nonstate theorists" and a very extensive empirical and theoretical literature has developed around them particularly since the 1960s with the publication of influential studies by T.X. Barber and others (Barber, 1969). As this well-rehearsed debate is relevant to the model to be presented later and also to ideas about hysteria it is worth outlining the two views briefly here (for a more extensive coverage see Fromm & Nash, 1992; Kirsch & Lynn, 1995; Lynn & Rhue, 1991; Wagstaff, 1998). There is first the more traditional "state" (or "special process") view, which holds that many of the phenomena included in the domain of hypnosis involve dissociate changes which are imposed on the subject by the fact of being engaged in a hypnotic induction procedure, resulting in an altered state of consciousness. The hypnotic state is thus considered in some way "abnormal" or at least out of the ordinary and the result of a significantly altered brain-state. Evidence, such as that presented earlier, that there are clear changes in brain activity as a result of hypnotic inductions and specific suggestions are often taken as supporting the "state" view.

The alternative, nonstate (or sociocognitive), view is that hypnotic phenomena involve expectancy-congruent changes in subjective experience, deriving from role-enactment by the subject in order to maintain a self-presentation as being "a hypnotised person". It emphasises the role of normal "mundane" psychological processes, especially those of role-play, compliance, and expectancy as manifest in all social situations. At first sight, the sociocognitive view is sometimes taken to imply that hypnosis is fake, trickery, and does not exist. Most sociocognitive theorists, however, accept the subjective "reality" of hypnotic phenomena, at least for some subjects. For example Spanos and Coe (1992), although pointing out that some "hypnotic" performances are outright faking, when the subject is unable to generate the experiences that they believe are required, they go on to add (p. 129):

A social-psychological conceptualisation does not view faking as a sole or adequate account of hypnotic responding. On the contrary, one of the most interesting aspects of hypnotic responding is that subjects, to varying degrees, appear to convince themselves temporarily that their arms are rising involuntarily, that a non-existent cat is sitting on their laps, that they can no longer remember well-learned material, and so on.

That hypnotic performances are not simply intentional compliance is well documented in demonstrations that high hypnotisables continue to respond to hypnotic suggestions and to maintain role appropriate behaviours even when they believe they are not being observed, whereas low hypnotisables who have been asked to role-play hypnosis do not (Perugini et al., 1998). I am aware of no

similarly controlled studies of symptom display in hysteria although it would be predicted that the results would be similar.

That is, hypnotised subjects are so totally convinced by their own social role-playing that they cease to recognise it as such. Or, in other words, the persons most fooled into believing the "role-play" is real are the subjects themselves. In a similar vein Sackeim et al. (1979) note that the hysterics in their studies seem able to "perceive and not perceive at the same time" and comment that "in order to be so wrong, they must first be right". They conclude that these and other aspects of the hysterics' performances fulfil their criteria for "self-deception". In an attempt to encapsulate the self-deceptive view of hypnotised subjects they have been labelled "honest liars". By the same token, hysterics should perhaps be seen as "genuine malingerers". Although the state/nonstate debate in hypnosis has a long history, and certain parallels with views about hysteria, there are recent signs that theorists are moving towards a more integrated view which preserves the essence of both sets of evidence (e.g. Kirsch & Lynn, 1995; Wagstaff, 1998). One strength of the model, presented in the next part of this paper, is that it encapsulates both views and suggests a way out of the hypnosis/hysteria paradox.

### A Model of Consciousness, Self-awareness, Hypnosis, and Hysteria

*Evolution of Consciousness and Self-awareness.* The model I wish to present arose originally from a series of neuropsychological studies investigating associative learning and memory in animals and demonstrated a surprising level of residual behavioural competence in the absence of neocortex. Building on this evidence it was suggested that the development of neocortex provided a new arena for the processing and manipulation of more complex environmental representations which supplemented rather than replaced the original associative mechanisms (Oakley, 1983, 1985; Oakley & Eames, 1985). This development added a rapidly expanding capacity for information processing where a variety of mental processes subserving learning, memory, and perception could be marshalled in the service of planning, problem solving, and decision making. The mental structures underlying these newly emerged knowledge-based, representational capacities were identified with "consciousness systems" to reflect the original meaning of the word conscious (Latin *con-* with, *scio-* to know or understand). As with the subcortical associative systems this newly evolved consciousness system was seen as competent and self-sufficient in producing adaptive and flexible behaviour and to contain within it all the mental capacities normally associated with "consciousness" as the term is more widely used in psychology and philosophy. Nevertheless, its continued development, and in particular the potential for parallel processing, created a practical problem in that the capacity to solve problems would eventually outstrip an individual's

capacity to carry out the resultant solutions. I proposed that brains resolved this practical problem by designating a part of their neocortical processing space as a "priority action system" where those representations within the consciousness system which were relevant to the most urgent environmental, or other, challenges, could be re-represented and form the basis for further processing and selective action.

Other less pressing problems could continue to be worked on in consciousness but would not have access to the priority action system, unless they too become urgent. In a similar way familiar, habitual or repetitive tasks could be carried out automatically within consciousness without involving the priority action system. Although this was not specified in the earlier model it might be added here that the consciousness system could be seen as operating in a more pluralistic, holistic, or intuitive fashion whereas the priority action system might be characterised by a more restricted, focused, linear, analytical or rational form of information processing and problem solving (see Oakley, 1999). An important aspect of this model is that it assumes that the contents of the specialised priority action system have the unique property which we identify as subjective experience and actions which result from its operation are experienced as voluntary. I labelled the re-representational, priority action system as *self-awareness*. A second important part of this view is that the decision of what to place in this priority action system comes from an executive structure within consciousness, not from within self-awareness itself.

*Executive Systems.* This view of an executive, decision-making system within a hierarchical cognitive system is similar in many ways to Hilgard's (1977, 1992) central control structure or executive ego, and Shallice's (1988) supervisory attentional system (SAS). Shallice's view is the more developed of the two in terms of the neurophysiological evidence to which it relates and more recently the SAS model has begun to be incorporated into theories of hypnosis (e.g. Kirsch & Lynn, 1998, Woody & Bowers, 1994), although I am not aware of any attempts to apply SAS notions directly to conversion hysteria. At its lower levels Shallice's model of mental functioning, particularly that controlling action, has a series of, usually learned, behavioural units, or schemata. At their most developed these consist of highly flexible scripts, or memory organisation packets (MOPs), such as that for making a journey. These MOPs are in turn capable of modulating the activation of more specific "source schemata", such as that for driving a car, which in turn can activate lower level component schemata, such as that for braking. Importantly, the schemata at various levels in this system can be activated by environmental and contextual stimuli through a decentralised semi-autonomous process, which Shallice and others have called "contention scheduling". Braking in response to a red light within the driving source schema would be an example of one of these lower level schemata.



For routine, well-learned activities this is an efficient way of producing appropriate actions without placing too heavy a demand on cognitive resources. However, in some situations habitual responses may not be appropriate and it may be necessary to override contention scheduling, for instance to inhibit the braking response in the foregoing example. For this, a higher level executive system is needed which on the one hand has access to representations of the environment and to the organism's intentions and cognitive capacities and on the other can modulate the action of the lower level schema-based systems. The SAS provides this executive control as is shown schematically in the lower part of Fig. 1. As might be anticipated from what has already been said the SAS is proposed to be active when planning and decision making are required, when carrying out novel or poorly learned action sequences, when engaging in dangerous or technically difficult actions, when inhibiting strong or habitual responses and, Shallice adds, in "overcoming temptation". Central to the functions of the SAS is a capacity to exert attentional control, particularly to mediate the sustaining of focused attention and to facilitate disattention to extraneous stimuli. Anatomically, the SAS is closely bound to the activities of frontal cortical systems and the deficits seen in frontal lobe injury patients can clearly be interpreted in terms of SAS impairment.

*Executive Systems and Subjective Experience.* In both Hilgard's and Shallice's model it is implied that any mental processing which takes place via the central executive becomes part of our subjective experience and any actions which ensue are experienced as voluntary. This has the unfortunate consequence of seeming to suggest that we should be aware of the decision-making activities of the SAS or executive ego rather than of the consequences of those decisions. In the present model it is suggested that, as in the Shallice and Hilgard models, the executive structures are part of "consciousness" systems but that it is one of the functions of the executive to select from the currently active representations in "consciousness" a subset which are relevant to current actions or concerns for re-representation within a subsystem, the self-awareness system, which can selectively use them to direct goal-related actions. As it is only the contents of the self-awareness system that constitute the contents of our subjective experience, and the actions which result from that system which are experienced as voluntary, the proposed model makes the necessary separation between the decision-making activities of the central executive and our subjective experience of the consequences of those decisions. For example, if we are faced with a novel situation and our attention shifts to a new set of stimuli we are subjectively aware only that our attention has shifted, not of the decision process that underlay that shift.

In this sense, the cortical central executive structure is given a role not unlike that of the efficient secretary who controls the flow of information into the office of the managing director (MD) of a large company. The MD is only aware of the



information arriving via the selective activities of the secretary and has a view of reality which is solely based on them. It should also be pointed out here that, in the interests of survival of the company, it is essential that the information passed onwards should be the best available to ensure appropriate action. It also may well be that the incoming information is processed by the MD in a unique and highly effective way and that the actions based on it are the best available. What will almost certainly be the case, however, is that the MD has the feeling of being in full command of the facts and of making voluntary decisions—which is exactly the (illusory) experience we have as we view our own mental activity through the limited window of self-awareness (Oakley & Eames, 1985). In a very real sense, the MD is the slave of the secretary (or the company as a whole) just as the self-awareness system is the slave of consciousness by virtue of the selective activities of the SAS or executive ego. This additional function of the executive control system is shown in the upper part of Fig. 1.

*An Account of Hypnosis and Hysteria.* The model as it stands thus raises the possibility that both internal and external agendas and pressure on the cortical central executive structure may influence the process of information flow. In essence, this is what is being suggested here to account for both the phenomena of hypnosis and the symptoms of hysteria. To take the case of hypnosis first: If, as a result of outside influence, consciousness systems, via the central executive structure, withhold sensory information from self-awareness or inhibit motor actions the result is the production of negative hypnotic phenomena (e.g. analgesia, blindness, and paralysis). The perceptual changes, as well as the motor effects produced in this way, are experienced by the subject as involuntary. If, on the other hand, sensory information is fed into self-awareness, or actions are generated directly without involving the self-awareness system, the individual experiences positive hypnotic phenomena which include subjectively real hallucinations, pain experiences, the scenarios of age-regression and “involuntary” ideomotor phenomena, such as arm levitation. Outside influences which can affect the consciousness system include suggestions from a hypnotist, expectations of the subject, task demands of the experimental situation, and other socio-cognitive factors.

Hypnosis, in other words, can be seen as a “contract” between the hypnotist and the individual’s consciousness systems to manipulate the contents of self-awareness, and to generate or inhibit action without its involvement. In the case of self-hypnosis the self-awareness system could be seen paradoxically as forming a “contract” with its consciousness systems to influence its own experience. This would account for the fact that it is possible to initiate intentionally in self-hypnosis the phenomenon of arm levitation which is then experienced, with some surprise, as being an involuntary movement.

A similar account could be offered for conversion hysteria, except that here the “contract” is generated entirely within consciousness systems as a result of



internal dynamics and motivations in the interests of providing a solution to what may be an otherwise insoluble psychological problem. The result is positive and negative symptoms which, as described earlier, parallel the phenomena produced in hypnosis and may be similarly influenced by sociocognitive factors. However, the solution achieved, in the form of conversion symptoms, may to an outside observer appear maladaptive and inappropriate. It is this, plus the need for the symptoms to be maintained over the longer term, which leads to the phenomena of hysteria being classed as pathological, whereas the similar more transient phenomena of hypnosis are not. The model thus provides an integrated account of both conversion hysteria and hypnosis, which nevertheless acknowledges the differences between the two. It also solves the hypnosis/hysteria paradox by allowing the phenomena in both domains to be the outcome of motivated, strategic role enactments orchestrated by an executive control system which nevertheless results in experiences which are subjectively "real" and involuntary.

In the proposed model the consciousness system retains its knowledge of the "true" situation during both hypnosis and the display of conversion symptoms and this may be used to account for the serenity, *la belle indifférence*, with which subjects and patients commonly accept the changes in their experience of themselves. There is no need to be concerned because at the more intuitive, perhaps emotional, level of consciousness systems the individual "knows" the phenomena are "unreal". Although, of course, at the more intellectual level of self-awareness the phenomena may be experienced as subjectively genuine. The display of "implicit knowledge" in both hypnosis and hysteria can also be seen in terms of the selective activities of the executive structures allowing information within consciousness systems to affect performance whilst withholding knowledge as to the source of that information. The model also places the selective action of the executive system at a very high level, or late stage, of processing, which is consistent with the neuropsychological, clinical, and empirical evidence reviewed in previous sections.

It was suggested earlier that the cognitive styles of the two systems may differ. In particular, the consciousness system was said to be characterised by high capacity, holistic forms of processing with the self-awareness system being more limited in capacity and analytical in style. This difference may explain why the enactments in hypnosis and hysteria appear to be more "intuitive" in their form and may not meet stricter analytical criteria. For instance, "trance-logic" in hypnosis and "worse-than-chance" performances of hysterics (which are nevertheless open to "correction" by externally supplied facts) may reflect the cognitive style of the more holistic, intuitive consciousness system. The idea that hypnosis involves a shift from an analytic to a more holistic style of processing is widespread in the hypnosis literature (Brown & Oakley, 1997, 1998).

It is an important feature of the model that the flow of information and the pattern of activation and inhibition orchestrated by the executive system should

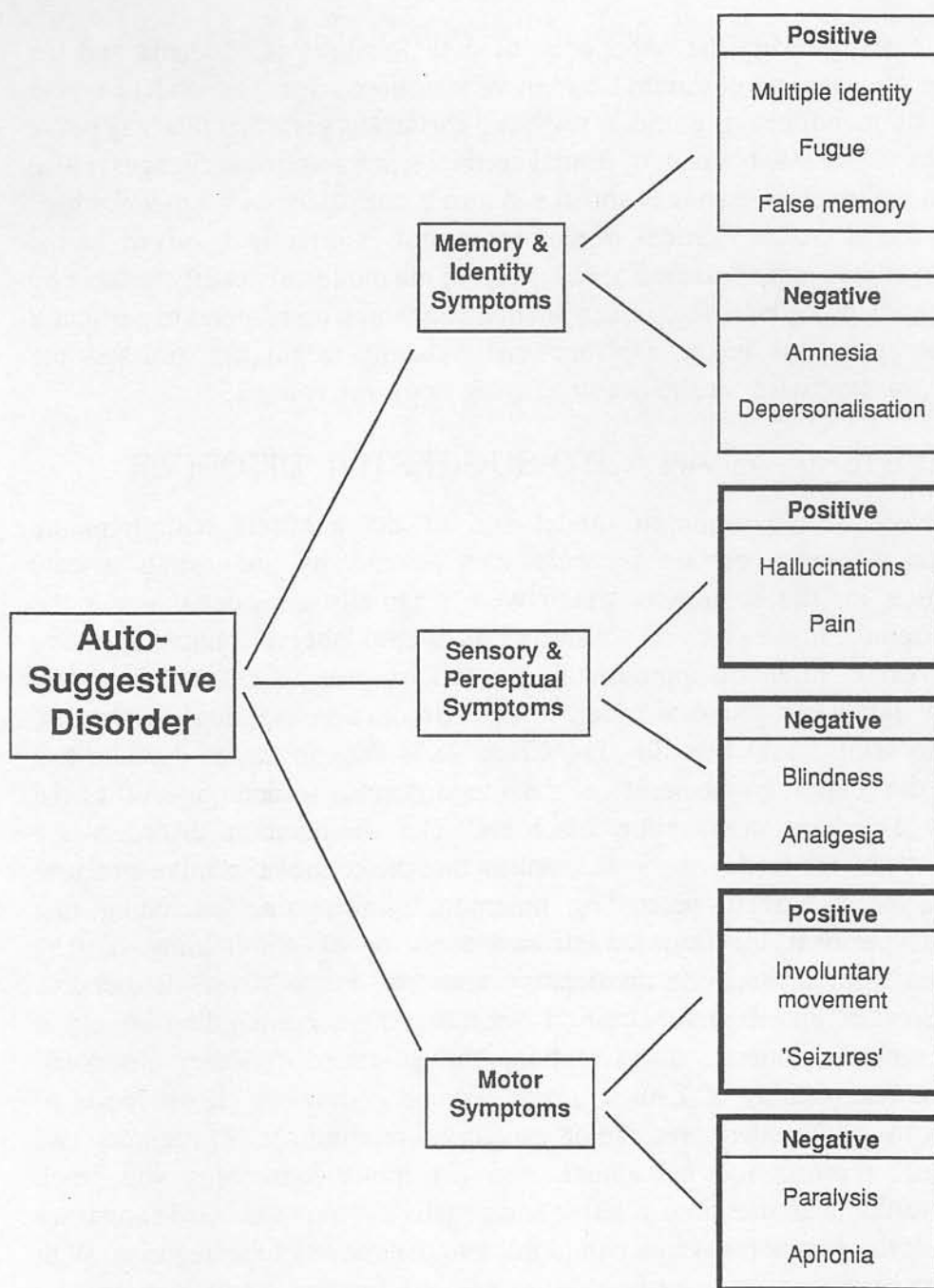


FIG. 2. A proposed scheme for classifying the positive and negative symptoms of hysteria (both conversion and dissociative) under the general heading of *auto-suggestive disorder*. Examples of particular symptoms in each of the subcategories are shown to the right of the figure. The boxes with the heavier outlines to the right correspond to conversion disorder symptoms.

not only change during the experience of both hypnotic phenomena and the symptoms of hysteria, but should do so in very similar ways. The evidence from the small number of imaging studies reviewed earlier suggests that this may prove to be the case. The involvement of frontal cortical systems in these changes is also evident from the imaging studies and this in turn is consistent with a model which proposes that a frontal cortical executive system is directly involved in the generation of these phenomena. These aspects of the model are readily testable by using hypnotic procedures to produce phenomena which correspond to particular conversion symptoms and to use functional imaging techniques to assess the similarity, or otherwise, of the accompanying brain activations.

### HYSTERIA AS AN AUTO-SUGGESTIVE DISORDER

On the basis of the proposed model and of the parallels with hypnotic phenomena reviewed earlier I would like to end by suggesting a new classification for the symptoms which were originally considered under the term "hysteria". In the place of "hysteria" an overall label of "auto-suggestive disorder (ASD)" might be appropriately created, or resurrected—as this is very similar to Babinski's proposal noted in the introduction (see also Kihlstrom, 1994). This term "ASD" would cover, from DSM-IV, conversion disorder and pain disorder (currently subclasses of the somatoform disorders) as well as the separately classified dissociation disorders. The dissociation disorders are encompassed by the model on the assumption that the central executive structure is capable of selectively presenting mnemonic information, including that relating to personal identity, to self-awareness or of withholding it. The dissociation disorders include dissociative amnesia, fugue states, dissociative identity disorder, and depersonalisation disorder. The corresponding effects in hypnosis include amnesia, disorientation, and so-called "hidden observer" phenomena (see Oakley & Eames, 1985). Figure 2 shows a classification of symptoms in ASD under three major categories relating to: (1) memory and identity; (2) sensory and perceptual; and (3) motor symptoms with each subgroup further classified into positive and negative symptoms. Also shown are examples of the symptoms which would fall into the various subcategories. With only minor changes to the wording the same classification could of course be applied to the phenomena of hypnosis.

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