Medically unexplained symptoms: a new model

Richard J Brown

Doctors frequently encounter patients with somatic symptoms that defy adequate medical explanation. Many such 'medically unexplained symptoms' (MUS) develop into chronic problems associated with considerable distress, disability and resource utilization. Despite the importance of this problem, the development of more effective treatments for MUS is hindered by inadequate understanding of the mechanisms of these conditions.

Previous models

Historically, there have been three basic models of MUS. All of these models have been refined since their initial development, although the basic elements remain in each case.

Dissociation

The dissociation model assumes that traumatic experiences create a deficit in attention that prevents memories from being integrated with the patient's personality.[1] As the patient has no control over these 'dissociated' memories, they may be activated by internal and external events producing a spontaneous experience of the memory content. Due to the patient's attentional deficit, however, the content is experienced as current reality rather than a memory. Broadly speaking, unexplained symptoms arise when the dissociated memories are of somatic sensations.

Consistent with the dissociation model, research has found that MUS patients often report early traumatic experiences. There is also some evidence of attentional deficits and of dissociations between different forms of cognitive processing in patients with MUS. Research in this area remains limited, particularly as there are doubts about how dissociation should be defined and measured.[2]

Conversion

The dissociation model assumes that memory fragmentation is a pathological consequence of trauma in individuals who are constitutionally vulnerable to dissociation. In contrast, the conversion model assumes that dissociation is a defensive response evolved to protect the individual from the overwhelming affect associated with trauma.[3] This traumatic affect is then 'converted' into somatic symptoms, allowing the affect to be expressed without its traumatic origins being acknowledged. The resulting reduction in negative affect is the 'primary gain' from symptoms. Any extrinsic benefits arising from the symptoms (e.g. attention from others, financial gain) are 'secondary gains'. The symptoms themselves are thought to be symbolic representations of the unconscious psychological conflict that is being converted.

One advantage of the conversion model is that clinicians often encounter patients with MUS where the symptoms seem to serve some kind of psychological function, have been precipitated by conflict or stress, or confer obvious gains. In practice, however, it is extremely difficult to establish an aetiological link between stress, defence, gain and symptoms. Moreover, these are often absent in many cases and are no more common in MUS than in general medical illness. The same is true for other phenomena often viewed as evidence for the conversion model, such as *la belle indifférence* (the lack or paucity of concern about disability and the prospect for recovery).[4]

Somatization

The somatization concept also assumes that MUS reflect psychological distress that is being experienced or expressed as somatic symptoms.[5,6] In this case, however, it is assumed that MUS have a multifactorial aetiology, with biological, psychological and social variables all regarded as important (Figure 1). Current cognitive–behavioural therapy (CBT) models of MUS overlap closely with the somatization concept and identify other relevant factors.

The main strength of the somatization model is its emphasis on the biopsychosocial nature of MUS and the empirical support linking these conditions with various biological, psychological and social factors. However, at present, the precise aetiological role of these factors is unclear. Like the conversion model, the somatization concept is also limited by its assumption that symptoms are necessarily a product of psychological distress, which is not well established empirically. Moreover, it can be difficult in practice to identify a clear link between a patient's distress and their somatic symptoms.

More generally, none of the available models provides a precise explanation of how it is possible for physical symptoms to exist in the absence of obvious physiological changes. Although physiological processes (e.g. autonomic arousal, muscle tension, deconditioning) can account for many MUS, this is unlikely to be true in all cases, particularly for certain unexplained neurological symptoms (e.g. sensory loss, pseudohallucinations, non-epileptic seizures).

Medically unexplained symptoms: a new model

In the remainder of this contribution, a novel model of MUS is presented. Rather than replacing existing approaches in this area, the model incorporates the dissociation, conversion and somatization models within a general framework based on research and theory from academic psychology. In so doing, the model explains how it is possible for physical symptoms to exist in the absence of physiological perturbation, or where physiological factors are insufficient to account for the clinical presentation. In addition, the model demonstrates that unexplained symptoms can arise

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Factors involved in creation and maintenance of medically unexplained symptoms according to the somatization and cognitive–behavioural models

Cognitive	Emotional	Behavioural	Temperamental	Physiological	Social
Illness beliefs	Fear	Medical consulting	Negative affectivity	Current/recent illness or injury	Reaction of significant others
Attention to body	Anxiety	Avoidance	Absorption	Emotional arousal	Iatrogenesis
Illness attribution	Depression	Reassurance-seeking	Hypnotic susceptibility	Previous illness experience	Insurance system
Illness worry	Anger	Body checking	Perfectionism	Normal physical perturbations	Compensation system
	Stress	Information-seeking	Personality disorder	Hormonal changes	Illness 'models'
	Interpersonal conflict	Reduced activity levels		Genetic factors	Reaction of colleagues
	Trauma	Defensive postures			

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from subtle alterations in normal psychological processes rather than mental disorder *per se*.

The basic premise of the model is that many MUS can be regarded as alterations in bodily consciousness and control. In order to explain these alterations, it is first necessary to model how normal consciousness and control operate in the brain.

Consciousness

Cognitive psychology has shown that the contents of consciousness are determined partly by incoming stimuli and partly by information in memory. In other words, the contents of consciousness are an interpretation of the stimulus world, based on existing knowledge in the system; this interpretation is one possible account of the world out of a number of competing alternatives. According to the current model, the receipt of sensory information activates a number of different 'hypotheses' about that information in memory. The most 'active' hypothesis is then selected by a primary attentional system (PAS) and combined with sensory data to produce an account of the environment or 'primary representation'. Primary representations are the basic contents of consciousness. The choice of hypothesis depends on the activation levels of hypotheses in memory. Activation levels vary according to the nature of incoming stimuli, how well learnt each hypothesis is, current goals and the activation of related information in memory.

As this process is performed pre-consciously, the individual is unaware that their conscious experience is a theory about the world rather than a direct record of it. The individual therefore takes their experience at face value, assuming that it is accurate.

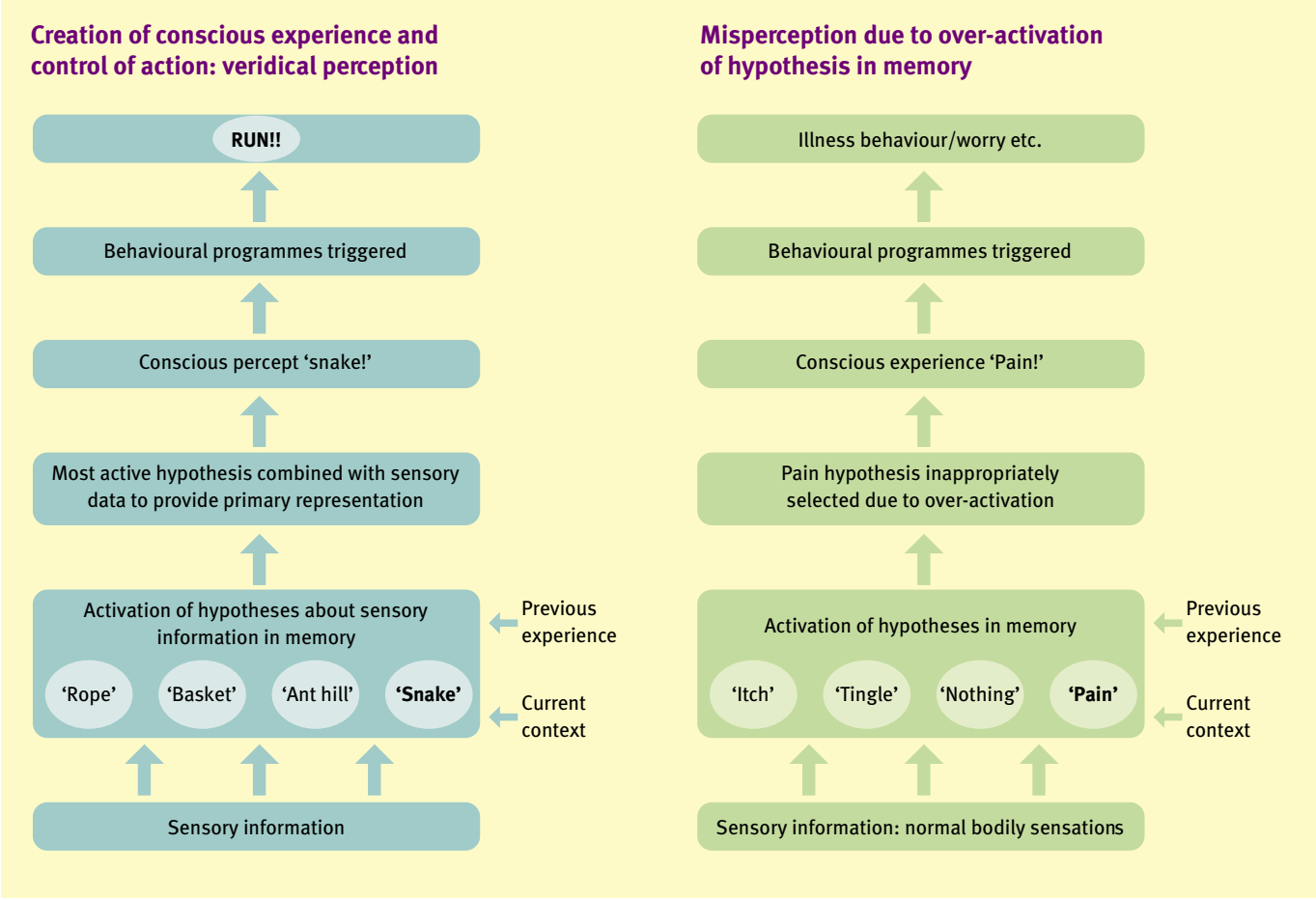
Cognitive control

Once a basic account of the world has been generated it can be used to control action. The model assumes that routine actions are controlled by a hierarchical set of memory programmes ('schemas'), which are triggered automatically by the creation of primary representations. Schemas represent the processing operations involved in different acts. At the top of the hierarchy are high-level programmes, such as driving a car. At the next level are programmes for different components of the high-level acts (e.g. changing gear). At lower levels are simple programmes for the most basic parts of an act (e.g. moving the left foot downwards 8 cm). Once high-level schemas are triggered, each of the component programmes is also primed for automatic activation by environmental events. In this way, very complex behaviours can be triggered quickly and efficiently, simply by perceiving the environment. Action controlled in this way is perceived as effortless and intuitive.

As existing memory programmes are insufficient to deal with novel situations, another level of action control is also required. In this account, novel situations are managed by a secondary attentional system (SAS), which controls action by biasing the activation level of schemas. Action controlled in this way is perceived as effortful, conscious and deliberate. Experientially, we typically 'locate' ourselves at the level of the SAS (rather than the PAS) as this is the province of self-consciousness.

Unexplained symptoms as alterations in consciousness and control

There are many instances (e.g. hallucinations, hypnotic phenomena, certain illusions) where experience is more consistent with what we believe about the world than information from the senses. Such examples demonstrate that material in memory can often override sense data as the contents of consciousness are created. According to the current model, this process is central to the generation of some MUS. By this view, these phenomena result from the selection of an inappropriate hypothesis (or 'rogue representation') during the creation of bodily consciousness and the control of action, reflecting over-activation of the representation



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in memory (Figure 2). The result is a compelling distortion in the body image experience as a somatic symptom. As individuals are aware only of the products of this process and not the process itself, they interpret their symptom experience as an accurate account of their bodily state and behave accordingly.

The nature of the resulting symptom depends on the rogue representation in question. Symptoms characterized by alterations in experience (e.g. pain, nausea, pseudohallucinations) will be associated with perceptual representations corresponding to the symptom in question. Symptoms characterized by an inability to control perception, action, or cognition (e.g. blindness, paralysis, amnesia) will be associated with behavioural representations (i.e. schemas) specifying the processing parameters of the relevant state (e.g. inhibition of visual information, movement or memory retrieval). These schemas are activated automatically by the creation of primary representations. One important implication of this is that unexplained symptoms are produced by psychological mechanisms but are not produced deliberately, as they involve the primary rather than the secondary attentional system.

Origins of rogue representations

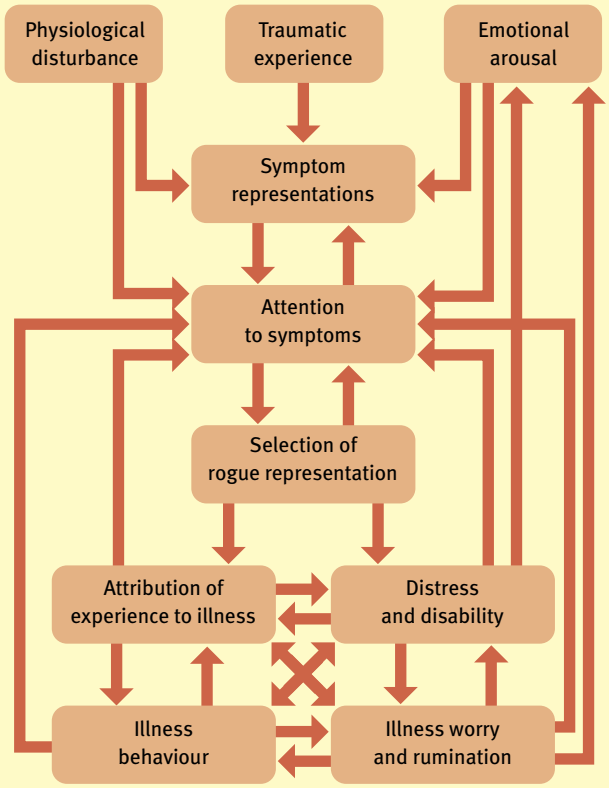
In many cases, rogue representations will be memories of previous illness episodes and physical states (e.g. of emotional arousal) in the individuals themselves. In other cases, the representations will have been acquired through exposure to physical states in others or via sociocultural transmission (e.g. the Internet).

Symptom maintenance

If unexplained symptoms reflect the over-activation of information in memory, what causes this over-activation? The primary factor in this respect is the repeated re-activation of this information by the secondary attentional system. Anything that increases symptom-focused attention therefore contributes to the development and maintenance of MUS (Figure 3). This category encompasses a wide range of biopsychosocial factors, overlapping closely with the somatization model (Figure 4).

Misattribution of symptoms: research shows that attention is diverted more to symptoms that are attributed to serious rather than benign causes. Many variables can influence whether an unexplained symptom is misinterpreted as evidence of serious illness. Thus, unusual, painful or disabling symptoms are more likely to be interpreted as serious than familiar or less distressing symptoms. Similarly, the related beliefs that symptoms necessarily indicate illness and that health is a state devoid of symptoms both predispose towards misattribution, as does medical information

Factors involved in the development of symptom chronicity



Adapted from Brown R J, *Psychol Bull* 2004; **5:** 793–812.

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Overlap between current model and previous accounts of MUS

Overlap with dissociation model

- Attentional dysfunction
- Separation between different levels of mental processing
- Activation of illness memories

Overlap with conversion model

- Defensive avoidance of traumatic affect
- Possibility that symptoms can recapitulate aspects of traumatic experiences (see Brown, 2004)

Overlap with somatization model

- Biopsychosocial model
- Symptom misinterpretation
- Emphasis on cognitive–behavioural therapy as treatment modality

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that is inaccurate, inappropriate or ambiguous. Misdiagnosis and/or medical mismanagement are likely to play a particularly important role in symptom misattribution.

Negative emotional states: symptom misinterpretation is often a significant source of anxiety. This not only contributes to further misattribution but also increases the degree to which individuals focus on their body for further signs of illness.[7] This is also true for other negative emotional states such as depression. In addition, such states are associated with bodily changes (e.g. autonomic arousal) that are a source of further symptoms.

Illness behaviour: once symptoms have been attributed to a physical cause, the individual may engage in a range of behaviours directed at bringing about symptom relief or reducing negative affect. Many such illness behaviours have the effect of increasing attention to the body, particularly when performed excessively. This includes physical and mental checking of the body to confirm symptom status, seeking information about symptoms (e.g. on the Internet), reassurance-seeking and repeated medical consulting. Other illness behaviours, such as doctor shopping, avoidance of medical examination/information and reducing activity levels, indirectly affect symptom-focused attention by preventing the individual from being exposed to information that could disconfirm a catastrophic interpretation of their symptoms. Avoiding activity can also cause secondary physical problems, as can defensive postures that the individual may adopt in the mistaken belief that they minimize damage and disability.

Illness worry and rumination: patients with MUS often spend a lot of time worrying and ruminating about their symptoms and the fact that doctors have been unable to explain and treat them. Worry and rumination both involve symptom-focused processing by the secondary attentional system and therefore play an important role in the continuing activation of rogue representations. Over time, the individual may get 'locked into' this form of processing activity making it increasingly difficult to ignore symptoms.[7]

Personality: individuals high in trait anxiety (or negative affectivity) are more likely to attend to physical symptoms, to misattribute them to physical illness and to worry about them excessively. Negative affectivity therefore contributes to the activation of rogue representations on several levels.

Defensive use of body focus: focusing attention on the body can also be an effective way of avoiding the cognitive and emotional activity associated with traumatic events. This could account for the relationship between early abuse and MUS.[4] Once developed, somatic symptoms also provide a way of expressing negative affect without acknowledging its psychosocial source.

Treatment implications

The model provides a detailed rationale for the use of CBT with MUS,[8] aids in the formulation of these conditions and identifies an important mechanism of change in many cases. It may be particularly useful in cases where it is difficult to identify obvious physiological perturbations that could account for symptoms, providing both clinicians and clients with a non-blaming way

of understanding how such symptoms could have been created and maintained. Symptom-focused attention and the distortion of sensory input are also likely to be important in the maintenance of MUS that have obvious physiological causes (e.g. autonomic arousal). As such, the model may inform formulation and treatment in these cases as well. Socialization to the model can be augmented with everyday examples of how bodily experience often misrepresents reality, including the placebo effect, battlefield analgesia and hypnotic phenomena. Emphasis should also be placed on the subjective reality of symptoms, the role of normal biopsychosocial processes and the non-threatening nature of MUS; often unpalatable issues such as gain, denial and unconscious conflict can be de-emphasized.

Treatment should focus on reducing the activation of rogue representations by minimizing symptom-focused attention. This will involve identifying and addressing factors that are maintaining symptom focus, particularly catastrophic misinterpretation, body checking, illness worry/rumination, help/reassurance-seeking and avoidance of feared situations and activities. Attention training treatment may be a particularly useful way of reducing symptom-focus.[9] Techniques such as hypnotic and imaginal suggestion also provide direct ways of reducing the activation of rogue representations. These may be augmented by physiotherapy and graded activity programmes that serve to activate more healthy representations of the body. ◆

FURTHER READING

Brown R J. Psychological mechanisms of medically unexplained symptoms: an integrative conceptual model. *Psychol Bull* 2004; **130:** 793–812.
(*Explains the model in detail.*)

Brown R J. Medically unexplained symptoms. In Tarrier N, ed. *Case formulation in cognitive behaviour therapy: the treatment of challenging and complex cases*. London: Brunner-Routledge, in press.
(Provides information about the cognitive–behavioural treatment of MUS, incorporating insights from the current model.)

Practice points

- Not all medically unexplained symptoms reflect the somatic presentation of emotional distress
- Medically unexplained symptoms can arise from subtle disruptions in normal psychological mechanisms that produce distortions in bodily consciousness and control
- Symptom-focused attention is a key factor in the creation and maintenance of unexplained complaints
- Other examples of how bodily experience often misrepresents reality (e.g. placebo effect, battlefield analgesia, hypnotic phenomena, dreams) can help patients understand how symptoms can exist in the absence of medical pathology
- Cognitive–behavioural therapy for medically unexplained symptoms should aim to minimize symptom-focused attention and symptom misinterpretation, while augmenting healthy perceptions of the body

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