



## Editorial

## Perspectives on hypervigilance

“Hypervigilance” might be defined as a behavior involving enhanced or exaggerated search of environmental stimuli or scan for threatening information. Certain groups of patients, predominantly those suffering from syndromes such as fibromyalgia (FM) have pain threshold and tolerance levels that are much lower than those of matched controls, and their pain reports to noxious stimulation are higher [10,16,19,25]. The term “hypervigilance” [4] has been used to describe this phenomenon by many of us who have been struck by the enhanced level of pain reactivity, but we differ, I think, in what we intend the term to convey about the underlying pathophysiology of such disorders.

For some, the label is probably a restatement of the basic phenomenon: FM patients have widespread endogenous pain, and are very responsive to induced pain. Others, struck by the fact that FM patients also report higher levels of bowel and pelvic disorders, headaches, temporomandibular disorders (TMDs), dysmenorrhea, chemical sensitivity, and fatigue, use the term to describe an enhanced level of reaction to a wide range of bodily signs. Perhaps, the term is too ambiguous; in the first case, a word such as “allodynia” or “hyperalgesia” may be more neutral with regard to mechanisms; the second viewpoint may deserve a more informative descriptor.

My group’s research on FM patients [16,19,22,25,27,28] led us to indicate that the pattern of physical complaints, self-described attentional focus, and perceptual reactivity to pressure, temperature, and sound which we labeled “generalized hypervigilance” requires a central mechanism, that extends beyond the somatosensory system. Our model [15,23,26] proposed that hypervigilance may compose a number of elements: greater sensitivity to stimuli, a high degree of monitoring of internal and external events, attribution of bodily signs to physiological causes rather than to environmental or psychological factors, maladaptive coping in dealing with elevated anxiety about bodily signs, and, perhaps, a biological predisposition to respond to negative experiences and thoughts with bodily reactions such as localized or widespread muscle tension. The model was intentionally broad and still warrants research on its various components.

Hollins et al., in this issue [11], have conducted a very interesting study that examines perceptual characteristics underlying greater reactivity to mechanical and auditory stimuli shown by FM and TMD patients. There were two important aspects of their investigation: asking patients and controls to scale a wide range of stimulus levels for pressure against the forearm and discordant auditory stimuli plus determining the intensity and the unpleasantness of the signals.

Their data replicate the earlier findings: FM patients, in particular, find moderate levels of pressure or sound amplitude to be markedly stronger than pain-free controls, and score much higher on a measure of common symptoms and sensations. Not only aver-

sive stimuli are amplified; even low levels of force are judged to be considerably greater in intensity and unpleasantness by FM patients (and, to some extent, those suffering from TMD).

The shift from unpleasant to painful experience occurs much sooner for FM patients than for controls as pressure increases. Patients show “robust perceptual amplification,” particularly those who score high on a questionnaire [21] used as a psychological index of hypervigilance. Patients also note that auditory stimuli are louder and more unpleasant than do the controls, although these effects are smaller. Similar auditory data regarding FM patients have recently been reported in other laboratories [3,8].

The data point to perceptual amplification that extends over the full dynamic range for these modalities, countering the notion that patients over respond only to unpleasant stimuli. Left open is the question as to whether this represents an enhanced level of sensitivity for the patients or a tendency to rate stimuli in a more profound manner, something which represents judgment criterion or tendency rather than sensitivity.

The roles of other possible characteristics of hypervigilant behavior, relating to bodily monitoring, symptom attribution, anxiety, maladaptive coping, and stress responsiveness, remain to be determined. Still open is the essential question of whether pain researchers who put forth constructs such as perceptual amplification, central sensitization, altered pain perception, diminished central inhibition, increased somatic focus, health anxiety, anxiety sensitivity, pain-related anxiety, body vigilance, kinesiophobia, fear avoidance, threat appraisal, somatization disorder, cognitive processing bias, preoccupation with pain sensations, physical concern, pain amplification syndrome, central modulation change, dysfunctional spectrum syndrome, central sensitivity syndrome, multiple unexplained symptoms, central inhibition dysfunction, augmented pain processing, somatosensory amplification, hypersensitivity to pain, central hyperexcitability, and attentional capture, among others, are really dealing with a profusion of factors influencing disorders such as FM, or are dealing with a very small set of factors and, essentially, revisiting the parable of the blind men and the elephant.

We are at an early stage in understanding complex psychophysical behaviors. Still, there has been a considerable progress concerning the interplay between biological and perceptual indices of FM with regard to genetic markers [2], functional neuroimaging [1,7,9], peripheral sensitization [12,20], stress regulation [17,18], temporal summation [31,32], and diffuse noxious inhibitory controls [13,14,30].

Behavioral studies of hypervigilance have emphasized its attentional characteristics [5,6,33,34], and have considered stimulus hyperresponsivity to involve different central mechanisms. This view may be too restricted. There are common cortical responses

to either pain or threat [35] in regions which respond differently in FM patients and healthy controls [1].

We do not know what role hypervigilance plays, if any, in the pathophysiology of disorders such as FM [23,24]. Does heightened responsivity to noxious stimuli shown by patients predate their clinical complaints (and thus may be a predisposing factor), does it arise in response to an accident or threat and serve, in some way, to precipitate a full-blown pain syndrome, or is it established after the patients develop a troublesome disorder of unknown etiology and act to perpetuate their physical and psychological symptoms? The recent evidence [29] that pain sensitivity is associated with the likelihood of later developing TMD symptoms is supportive of the notion that hypervigilance is a risk factor for the onset of chronic pain disorders. It remains to be determined whether biological or psychological intervention in pain-free but hypervigilant individuals can protect them against the development or expression of future pain syndromes.

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