

Commentary

A new direction for the fear avoidance model?

Almost everyone suffers acute pain. Why do most recover, but an unfortunate few descend a downward spiral of social, personal and economic disadvantage? One hypothesis that has been interrogated for two decades is the fear avoidance model [14]. This model argues that it is the overly fearful people who end up with chronic pain: they avoid movement and activity so as to not provoke pain and this in turn leads to disengagement from meaningful activities, disability, and depression. Therein, so the model suggests, begins a vicious cycle. That fear of pain might have a larger impact on behavior than pain itself was, in fact, suggested some time ago [1,7], and the subsequent development of the fear avoidance beliefs questionnaire [15] led to a great number of clinical and experimental investigations.

Nonetheless, the case is not settled and some might argue that the fear avoidance model has not lived up to its considerable expectations. Some studies suggest that fear avoidance beliefs at baseline predict chronicity, with larger effects on disability than on pain intensity [4,5,16]. As with many clinical studies, the most robust studies report the smallest effects [13]. One might contend that fear is not the driving factor – patients seldom display cardinal signs of fear (unless directly confronted with having to perform the movement, for example in fear-exposure therapy [2]), – they simply avoid the movement. Avoidance would seem understandable if pain is conceptualized as a correlate of tissue damage, which it usually is [9]. Perhaps the most parsimonious conclusion of the large amount of literature in this area is that the fear avoidance model, in its current form, provides a very useful, but somewhat simplistic understanding of the development of chronicity after an acute episode. Indeed, fear of movement seldom exists in isolation from other ‘yellow flags’ [12].

Experimental evidence may help to clarify and refine the fear avoidance model. Indeed, there is accumulating evidence that pain disrupts sensory and motor processing in a manner consistent with avoidance behavior. For example, in healthy volunteers, somatosensory processing of a non-noxious cue is disrupted when it is conditioned with a subsequent painful shock to the back [3]. Furthermore, painful stimulation of the back in association with a particular arm movement induced a systematic change in the postural (ie, unintentional and automatic) activation of the trunk muscles associated with that arm movement, but not other arm movements [11]. Notably in that study, although the majority of participants returned to normal muscle activation once the movement no longer evoked the painful shock, a small proportion did not. Those few were characterized by catastrophic interpretations of back pain and injury [10]. Finally, when healthy participants were expecting low back pain because they had been injected with (non-noxious) isotonic saline after a conditioning stimulus of (noxious) hypertonic saline [6], they used their trunk muscles differently during walking, without changing their walking speed or cadence.

In this issue of *Pain*, Meulders and Colleagues [8] extend this research and present a useful experimental paradigm for the investigation of fear-pain interactions. Healthy volunteers moved a joystick up and down or side to side, in order to ‘colour in’ shapes shown on a monitor. In one experimental condition, movement of the joystick in one of the directions activated a painful electric shock to the hand that was moving the joystick. In the other condition, an equal number of painful shocks of the same intensity were delivered, but they were delivered between movement trials. Fear of the movement was measured via self-report and by the magnitude of the eyeblink startle response to the auditory probes during movements. Avoidance was estimated by the response latency between the visual cue to move and actual movement of the joystick. Several of the findings are worthy of particular mention. First, once a particular movement had been conditioned with the painful stimulus, it evoked a bigger startle response than did the other movement. This finding suggests that the paradigm had induced fear of the painful movement. Second, the response latency was increased for the conditioned movement, but not for the unconditioned movement. The paradigm had induced an unintentional delay in movement execution, which the authors argue reflects avoidance. Finally, although the conditioned movements induced more fear than the unconditioned movements, the inter-trial period was associated with more fear during the unpredictable condition than during the predictable condition. The authors raise an interesting interpretation of this finding – that the predictable condition is consistent with task-specific chronic pain and the unpredictable condition is consistent with generalized pain disorders, such as fibromyalgia. Alternatively, perhaps fear is greater when people perceive that their pain is uncontrollable – a possibility that has been studied at some length. The paradigm developed by Meulders et al. [8] would seem well suited to interrogating these possibilities.

The Meulders et al. study also raises some interesting questions. For example: How important is the spatial coherence of the movement cue and the painful stimulus? How important is the movement itself – is it dependent on proprioceptive cues, as suggested by the authors, or is it associated with the command to move, or is it unrelated to both and simply the result of the cue itself? Is the impact proportional to self-reported pain-related cognitions, for example, the conviction that pain reflects tissue damage? By what mechanism might delayed movement be related to chronic problems? Clearly, much work is needed, but the approach presented by Meulders et al. certainly suggests a feasible way to proceed. Hopefully, future studies will begin to untangle these issues.

Conflict of interest statement

The author declares no conflict of interest.

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