Commentary to “Do words hurt? Brain activation during the processing of pain words” by Richter et al.

Are we focussing on the right stuff when we investigate pain in chronic pain patients? This seemingly puzzling question might become more intelligible as soon as the understanding of chronic pain tries to benefit from research on anxiety disorders. Patients with pathological levels of anxiety do not only show intensified emotional reactions to feared objects or feared cognitions but are already responsive to signals for and symbols of these conditions. They appear to suffer from the fact that too many of these signals and symbols exist in their worlds and prime anxiety whereas cues for safety are too rare [3]. As a result, they scan their environment continuously for anxiety-related stimuli and switch their brain to a mode that facilitates processing of negative emotions [4].

If this assumption also holds for chronic pain patients, the most outstanding finding would not be that they show an intensified processing of noxious stimuli due to an unbalance of excitation and inhibition. Instead, the more important characteristic would be that pain patients respond to non-noxious and near-noxious stimuli and events associated repeatedly with pain (signals or symbols of pain) in a way as if these conditions were noxious. In the latter respect, they might differ more pathognomonically from healthy individuals than in the former. The pathophysiological function of these widely generalized responses, which are no longer specific for actually noxious stimulation, might be the persistent preparation and priming of pain with the consequence that harmless, near-noxious but physically non-threatening stimuli become amplified to act as full-blown pain stimuli.

According to this hypothesis the question arises; can pain signals and symbols really do this? Or recapitulating Richter et al. [5], in this issue of Pain, do pain words hurt? Given that in this study the pain words presented during a fMRI session appeared to activate large parts of the brain networks known from studies, in which noxious stimuli were applied, one is tempted to agree. Richter et al. are not the first to suggest that pain symbols can elicit very similar cerebral responses as painful stimuli do [1,6] but these authors did that again in a very systematic and compelling fashion.

However, can we conclude that neuronal activation in pain-related brain areas in response to pain words indicates an actual pain experience? This can certainly not be agreed upon in the strictest phenomenological sense but potentially in form of a bias in attention for and emotional interpretation of consequent stimuli. Brain imaging studies in the future might answer this question by assessing the cerebral effects of near-noxious and noxious stimuli preceded by pain symbols compared to those without this type of pre-treatment. The study of pain words is not only methodologically convenient but tests the preparatory and priming effects of the first human communication system. The displays of facial pain responses as parts of the second human communication system might act similarly and might also be studied in their functions as pain primes with promising results.

Another still unanswered question is whether the activation of the cerebral pain network by pain words or pain faces reads all individuals for processing of pain in a similar fashion or whether individual differences have to be taken into account. Concepts such as pain hypervigilance, pain catastrophizing, pain anxiety, etc., set up for explaining individual differences, might be relevant moderating factors if pain is about to develop out of the ready state triggered by pain symbols.

The preparatory and priming action of pain symbols can be studied with elegance in brain imaging studies as shown by Richter et al. but there are also behavioural tests at hand, i.e. the dot-probe task, emotional Stroop paradigm, exogenous cueing task (e.g. [2]). If the parallelism between anxiety and pain research holds, patients with full-blown functional pain problems might be characterized by both intensified responses to proximal (responses to noxious stimuli studied by pain psychophysics) and distal (responses to pain symbols studied by these behavioural tests) pain stimuli. Longitudinal studies would be necessary to determine the genesis and mutual interactions of these two levels of aberrant pain processing.

References


Stefan Lautenbacher
Physiological Psychology, University of Bamberg, Marktplatz 3, 96045 Bamberg, Germany.
Tel.: +49 951 8631851; fax: +49 951 8631976.
E-mail address: stefan.lautenbacher@uni-bamberg.de