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# *The McGill Pain Questionnaire*

## *From Description to Measurement*

*Ronald Melzack, Ph.D.**

On the language of pain. By Ronald Melzack, Warren S. Torgerson. ANESTHESIOLOGY 1971; 34:50–9. Reprinted with permission.

**The purpose of this study was to develop new approaches to the problem of describing and measuring pain in human subjects. Words used to describe pain were brought together and categorized, and an attempt was made to scale them on a common intensity dimension. The data show that: 1) there are many words in the English language to describe the varieties of pain experience; 2) there is a high level of agreement that the words fall into classes and subclasses that represent particular dimensions or properties of pain experience; 3) substantial portions of the words have approximately the same relative positions on a common intensity scale for people who have widely divergent backgrounds. The word lists provide a basis for a questionnaire to study the effects of anesthetic and analgesic agents on the experience of pain.**

HISTORY has always fascinated me, particularly the difficulty of reconstructing events that occurred in the recent past, such as battles during wars and scientific discoveries. This revisiting of my article with Warren Torgerson on the language of pain[1] has allowed me to try to reconstruct the origins of the McGill Pain Questionnaire (MPQ), which is now widely used in research on pain and anesthetics.

In the 1950s, when I was a graduate student in experimental psychology at McGill University (Montreal, Quebec, Canada), an instrument to measure pain—the dolorimeter—had recently been developed and was gaining widespread acceptance.[2] The instrument focused radiant heat on a point of a person's hand, and the heat intensity at which the person said "ouch" (pain sensation threshold) and later pulled away from the instrument (pain tolerance threshold) were recorded. The unit of measurement (based on the heat increase between the two thresholds) was called a *dol*. In the numerous studies that followed,[2] the intensity of clinical pain was measured in terms of dols. For example, women in labor were asked when the amount of heat pain produced on the back of their hand equaled the pain of a labor contraction, and the report was recorded in terms of the number of dols.

I soon became convinced that dolorimetry was an absurd idea. I knew that the pain of a tiny burn is not like a headache, a toothache, a heart attack, or a kick on the shin. To measure all pains as though they are qualitatively the same and vary only in intensity implies that there is a specific, straight-through pain pathway from skin to a pain center in the brain. It assumes a one-to-one relation between the magnitude of an injury and the intensity of pain sensation. That assumption was refuted by Henry K. Beecher's (1904–1976; Professor and Chair of the Department of Anesthesiology, Massachusetts General Hospital, Boston, Massachusetts) remarkable observations on the impact of meaning, attention, placebos, and a host of other psychological variables on pain perception.[3] It was also refuted by my doctoral thesis research, which showed that sensory experience during early development in dogs influences pain perception at maturity.[4]

In 1953, William K. Livingston[5] (1892–1966; Professor and Chair of the Department of Surgery at the University of Oregon Medical School, Portland, Oregon) visited his friend Herbert H. Jasper, M.D., Ph.D. (1906–1999; Professor, Department of Neurology, McGill University) at the Montreal Neurological Institute. Jasper was aware of my interest in pain and introduced me to Livingston. A

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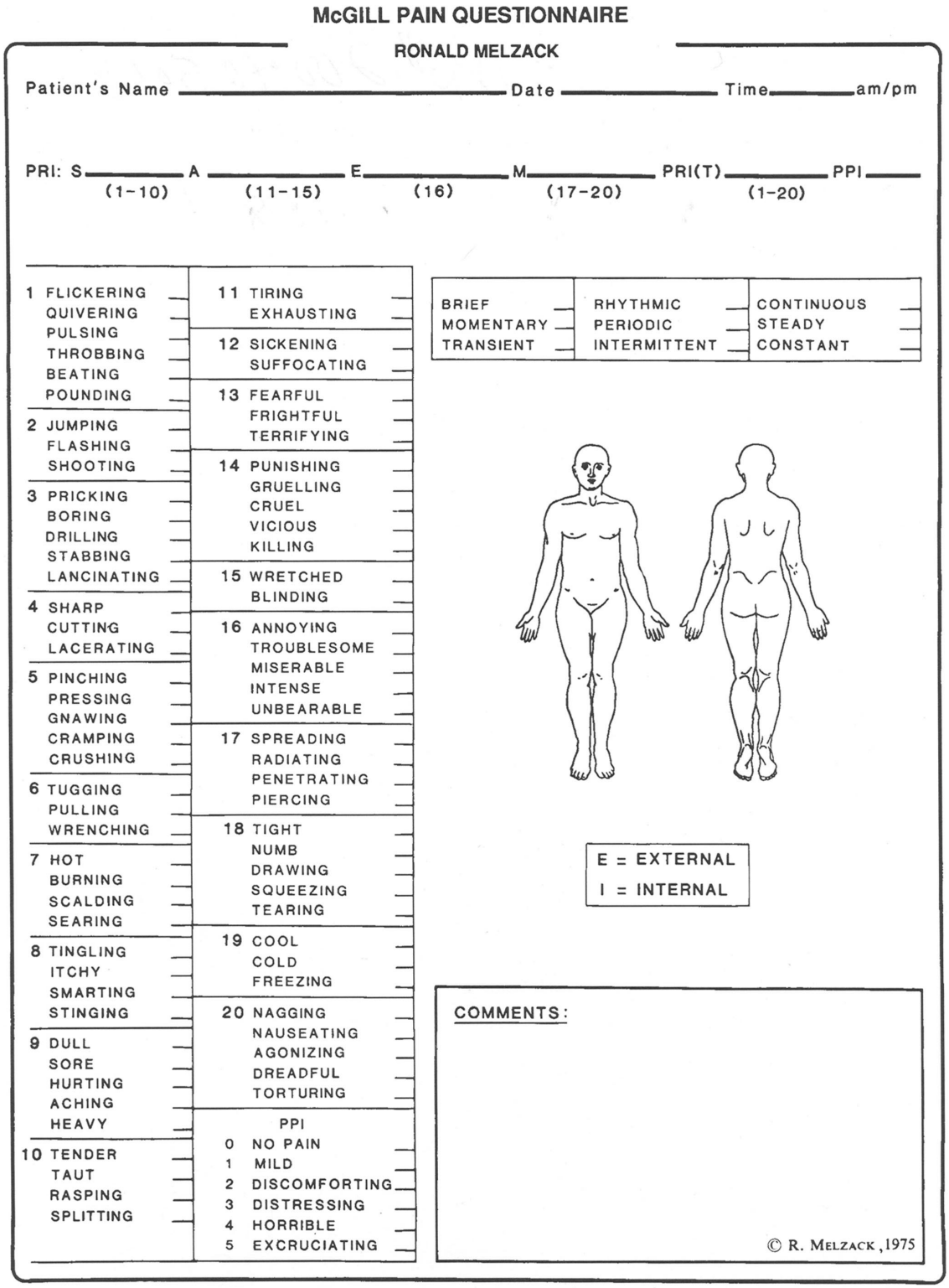


**Fig. 1. The McGill Pain Questionnaire. The descriptors fall into four major groups: sensory (S), 1–10; affective (A), 11–15; evaluative (E), 16; and miscellaneous (M), 17–20. The rank value for each descriptor is based on its position in the word set. The sum of the rank values is the pain rating index (PRI). The present pain intensity (PPI) is based on a scale of 0–5. Copyright 1975 Ronald Melzack.**

few months later, to my delight, Livingston wrote to invite me to work with him. He informed me that he had a small laboratory in which young investigators conducted basic neurophysiologic research and that he had also started a pain clinic for patients with intractable pain.[6] Happily, I obtained a fellowship and took part in physiologic research that rejected the idea of a single, specific "pain pathway." We discovered that nerve im-

pulses evoked by stimulation of a cat's tooth pulp (unquestionably a good source of pain) projected through multiple pathways to midbrain reticular structures and limbic system structures as well as to somatosensory thalamus and cortex.[7–10] As a result, I found it even more difficult to believe that all these brain areas do nothing more than evoke a simple one-dimensional sensation.

During my second postdoctoral year, Livingston invited me to attend his pain clinic, where he and anesthesiologist Frederick P. Haugen (1908–1987; Professor, Department of Surgery, University of Oregon Medical School) examined four or five patients each Tuesday afternoon. These patients had difficult, challenging pain problems that did not respond to the conventional treatments available at the time. Livingston's sympathy and concern for these people was evident. He told me when he invited me, "Ron, it's time for you to listen to patients suffering more pain that you can imagine. It'll put your physiologic research in a broader perspective." He was absolutely right. These visits had an enormous impact on my thinking.

At the first pain clinic I attended, Livingston introduced me to Mrs. Hull, an impish, delightful woman in her mid-70s who was diabetic, had developed a gangrenous foot, and underwent an above-knee amputation. She experienced horrible phantom limb pains, which she described in vivid detail, using a rich vocabulary. That meeting, although I did not know it until years later, was the beginning of a sequence of events that led to the MPQ.

I was fascinated by Mrs. Hull's phantom limb pain, particularly by her descriptions of burning, shooting, cramping pains. Soon, I began to record these descriptions. They were a superb refutation of the idea that pain was a single sensation that varied only in intensity. Shortly after I met Mrs. Hull, her "good leg" became diseased and I visited her after it was amputated. Even more words were used to describe the pains in both limbs. I jotted down her descriptions and also began to record the words used by other patients who had tabes dorsalis, reflex sympathetic dystrophy, back pains, and so forth. My list grew. By the time I left Livingston's department, I possessed more than a hundred words, but I had no idea of what to do with them. I knew that patients with different pain syndromes used different sets of descriptors, and more intense pains were described with more words. Mostly, I saw them as evidence of the complexity of pain mechanisms.

From Portland, Oregon, I went to University College London, (London, United Kingdom) where I had been invited as a guest lecturer in the psychology department for a year. I supervised the research projects of two undergraduate honor students in the attempt to classify the hundred-plus words into groups, but I failed to find a larger framework that might make sense of them. Pain, at the time, was a sensation, and affective, emotional words did not belong in a sensory system.

The following year, the words were set aside when I moved to Pisa, Italy, to work with Dr. Giuseppe Moruzzi (1910–1986; Professor and Head, Institute of Physiology, University of Pisa) and, after that, when I was appointed Assistant Professor at the Massachusetts Institute of Technology (Cambridge, Massachusetts). There I met Patrick Wall (1925–2001; Professor, Department of Biology, Massachusetts Institute of Technology; later: Professor of Anatomy, University College, University of London, London, United Kingdom) and had countless discussions with him that eventually led to the gate control theory of pain.[11] I gave occasional thought to my collection of pain descriptors and spent a few hours from time to time trying to make sense of the words and what use they could have in advancing our understanding of pain. It gradually dawned on me that the words could serve as a questionnaire that would provide credible evidence of the perceived, subjective qualities of a person's pain and perhaps throw light on what parts of the brain were involved in producing such feelings.

Years earlier, Livingston had helped me to become aware of the emotional and motivational aspects of pain,[6] and in the course of writing an article on pain perception for *Scientific American*,[12] I realized that the pain descriptors (at least a large number of them) could be classified into three major groups: sensory, affective, and evaluative. These dimensions of experience, I thought, would provide a parsimonious framework for subgroups of words of different qualities that could be ranked on an intensity scale. However, the pain words were secondary to the other problems I was working on.

Then, at a meeting of psychologists from the Massachusetts Institute of Technology and Harvard ("The Pretzel Club") who met one evening every few weeks to drink beer, eat pretzels, and give talks to describe their research activities, I suddenly found a colleague to work with me on the pain words. Warren Torgerson (1924–1999; Research Associate, Lincoln Laboratories, Massachusetts Institute of Technology) gave a talk that described his work in statistics—in a new field called *multiple group discriminant analysis*[13]—which fascinated me. For example, he asked subjects to classify scribbles of lines into groups on the basis of their similarity to each other. Torgerson, who was known to his friends as "Torgie," had developed and studied statistical methods to analyze these kinds of data. Listening to Torgie, I suddenly realized that if people could sort scribbles into groups based on similarity or difference, surely they could do the same with the 102 pain words I had already partially classified but did not know how to proceed with from there. After Torgie's talk, I briefly described what I had in mind. He replied that he would think about it. At the next Pretzel Club meeting, he came over to me and said, "That's an interesting problem you described; I'd like to join you." Torgie knew little about pain but was a superb statistician.

During the following years, Torgie and I designed experiments and acquired a substantial amount of data.[1] However, in 1963, I left the Massachusetts Institute of Technology and was appointed Associate Professor at McGill. Pat Wall and I continued to exchange drafts of the gate theory article until we decided to submit it to *Science*, which published it in 1965.[11] Torgie and I also exchanged drafts of our article, in which the number of descriptors was reduced to 78, and a verbal intensity scale—the Present Pain Intensity—was added. However, our collaboration was soon to end. In 1964, Torgie was appointed Chair of Psychology at Johns Hopkins University and moved to Baltimore, Maryland. The administrative activities of his department were now his first concern, so that the time intervals between drafts became increasingly long. After our article was finally published in ANESTHESIOLOGY in 1971,[1] I continued on my own.

The publication of the article with Torgerson led to a few reprint requests but little initial interest. At McGill, however, I met Philip Bromage (1920–), then Chair of Anesthesiology at the university and head of the Department at the Royal Victoria Hospital (Montreal, Quebec, Canada). We instantly found a shared interest in phantom limb pain[14,15] and later organized a two-person Pain Clinic. The clinic and its relation to other departments at McGill's teaching hospitals provided a marvelous opportunity for the use and refinement of the pain descriptor questionnaire. When I described it to colleagues, I was forced to give it a name and decided on the McGill Pain Questionnaire (fig. 1). Clinical studies using the MPQ were conducted over a period of approximately 5 yr and were summarized in the first article on the MPQ, which was published in the first volume of the journal *Pain*,[16] edited by my friend and colleague Patrick Wall.

Interest in the MPQ grew, partly to discredit it. Attempts were initially made to abolish the cognitive (evaluative) dimension, which led to vigorous debates in the pain literature and a large number of sophisticated statistical analyses but no acceptable conclusion. Other studies argued that there was no need for three dimensions; one was enough. Nevertheless, the MPQ survived intact and was used increasingly in academic studies.[17]

In 1980, I realized that the MPQ was too long and complex for use in most clinical trials of new therapies, but the only alternative was the visual analog scale, which provides a single score of a single intensity dimension.[18] I therefore decided to produce a short form of the MPQ (SF-MPQ).[19] This turned out to be a relatively easy task of choosing the most commonly used sensory and affective descriptors in all the clinical studies I had performed up to that time and adding a simple intensity scale (mild, moderate, severe) for each word. By including the Present Pain Intensity and the visual analog scale, the SF-MPQ provides five scores: sensory, affective, and total scores from the MPQ descriptors, and overall intensity scores from the Present Pain Intensity and visual analog scale. If a clinical trial of a new therapeutic procedure or drug does not obtain significant differences compared with placebo from the majority of these, it is clear that the new product is not clinically effective. The SF-MPQ correlates very highly with the standard MPQ and has been adopted for important clinical trials.[20] Recent studies have revealed the validity of the structure of the SF-MPQ and its usefulness after translation into many languages.[21]

As I look back, I realize that my fascination with pain descriptors as a reflection of the multiple dimensions of pain perception had a powerful impact on my thoughts on the neural basis of pain.[22,23] Pain is a subjective experience that is generated by widespread, parallel neural networks in the brain on the basis of multiple inputs from sensory systems as well as from brain areas that underlie past experience, attention, evaluation, and meaning. Pain is produced by the output of these neural networks, not solely by the sensory input into them.[24] Humans are fortunate to have language to express their pain so that it can be known to others and, we hope, can be diminished by our growing armamentarium of therapies.

## References


1. Melzack R, Torgerson WS: On the language of pain. ANESTHESIOLOGY 1971; 34:50–9
2. Hardy JD, Wolff HG, Goodell H: Pain Sensations and Reactions. Baltimore, Williams & Wilkins, 1952
3. Beecher HK: Measurement of Subjective Responses. New York, Oxford University Press, 1959
4. Melzack R, Scott TH: The effects of early experience on the response to pain. J Comp Physiol Psychol 1957; 50:155–61
5. Livingston WK: Pain Mechanisms. New York, Macmillan, 1943
6. Livingston WK: Pain and Suffering. Seattle, IASP Press, 1998
7. Kerr DIB, Haugen FP, Melzack R: Responses evoked in the brainstem by tooth stimulation, Am J Physiol 1955; 183:253–8
8. Haugen FP, Melzack R: The effects of nitrous oxide on responses evoked in the brainstem by tooth stimulation. ANESTHESIOLOGY 1957; 18:183–95
9. Melzack R, Haugen FP: Responses evoked at the cortex by tooth stimulation. Am J Physiol 1957; 190:570–4
10. Melzack R, Stotler WA, Livingston WK: Effects of discrete brainstem lesions in cats on perception of noxious stimulation. J Neurophysiol 1958; 21:353–67
11. Melzack R, Wall PD: Pain mechanisms: A new theory. Science 1965; 150:971–9
12. Melzack R: The perception of pain. Sci Am 1961; 204:41–9
13. Torgerson WS: Theory and Methods of Scaling. New York, Wiley and Son, 1958
14. Melzack R, Bromage PR: Experimental phantom limbs. Exp Neurol 1973; 39:261–9
15. Bromage PR, Melzack R: Phantom limbs and the body schema. Can Anaesth Soc J 1974; 21:267–74
16. Melzack R: The McGill Pain Questionnaire: major properties and scoring methods. Pain 1975; 1:277–99
17. Pain Measurement and Assessment. Edited by Melzack R. New York, Raven Press, 1983
18. Jensen MP, Karoly P: Self-report scales and procedures for assessing pain in adults, Handbook of Pain Assessment, 2nd edition. Edited by Turk DC, Melzack R. New York, Guilford Press, 2001, pp 15–34
19. Melzack R: The Short-Form McGill Pain Questionnaire. Pain. 1987; 30:191–7
20. Terajima K, Aneman A: Citation classics in anesthesia and pain journals: A literature review in the era of the internet. Acta Anesth Scand 2003; 47:655–63
21. Melzack R, Katz J: The McGill Pain Questionnaire: Appraisal and current status, Handbook of Pain Measurement, 2nd edition. Edited by Turk DC, Melzack R. New York, Guilford Press, 2001, pp 35–52
22. Melzack R, Casey KL: Sensory, motivational, and central control determinants of pain: A new conceptual model, The Skin Senses. Edited by Kenshalo D. Springfield, Illinois, Thomas, 1968, pp 423–43
23. Melzack R: Phantom limb pain: Implications for treatment of pathological pain. ANESTHESIOLOGY 1971; 35:409–19
24. Melzack R: Phantom limbs and the concept of a neuromatrix. Trends Neurosci 1990; 13:88–92