Discussion

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The two papers this morning deal with two of the less studied and less quantified senses—pain and taste. While all sensation occurs through the excitation of sensory receptors within the organism (or on its surface), pain and taste, unlike the distance senses (the visual and auditory), are referred to locations on or within the skin of the organism in the case of pain, and on the tongue in the case of taste, rather than to the world outside the organism. For this reason, perhaps, their measurement has lagged behind the other senses. In the case of pain, it has remained a private event not readily open to public scrutiny. To some extent this also holds true of taste. On the other hand, while vision and audition also are basically private events, they can be more readily controlled and triangulated from the outside and thereby become more open to public scrutiny.

Pain is not only the origin for medicine, but it is probably also the beginning of consciousness, the beginning of self as differentiated from the environment. Psychopathology can hardly be imagined without the presence of pain. Why then has its measurement lagged? The only answer that I can offer is that, unlike the other sense modalities in which one can relate percepts to external criteria, pain is still a self-referred sense. Warmth too is a self-referred internal event, but in the course of time it became possible to obtain external criteria for gauging the degree of warmth present. History records that the initial steps in the direction of the measurement of warmth came in the form of rating scales ranging from the hottest day of summer to the coldest day of winter with two intervening subdivisions. The first breakthrough in relating subjective warmth and its measurement probably occurred when it became possible to modulate the source of warmth so as to increase or decrease the subjective feeling. The objective measurement of vision was more easily developed because the relation between vision and light was much more readily felt, and control and measurement of the objective source of light was more easily obtainable. The same holds true of the relation between hearing and sound. But in the case of pain it is taking a longer time and is more difficult to determine the adequate stimulus for pain, and to measure it against
external criteria. We have not yet found the best way of doing it today.

In measuring the response to a light stimulus we observe that the response can be detected on several levels: the physiological, sensory, perceptual, psychomotor or conceptual. The same may be said to hold true of the response to stimuli which evoke pain. But it is debatable whether the usual meaning of the term pain refers to its physiological, sensory, perceptual, psychomotor or conceptual aspect. It may very well be that the conceptual component of pain, the stored memories of previous pain experiences, are far more important in the response to a painful stimulus than is the stimulus itself. Evidence for this comes from the studies of Hebb and his students, in which animals who had been prevented from being exposed to painful stimuli in their early development found it very difficult to learn how to respond adequately to painful stimuli later. Perhaps early experience with pain is the only way in which an animal can develop the proper response to pain, and hence the conceptual component developed from past experience is very important.

Dr. Beecher in his paper draws attention to the distinction between the psychophysical approach to pain provided by Hardy, Wolff and Goodell and the method of titrating pain by 15 mg. of morphine through the measurement of the half-life of painful experience (when the pain is subjectively reduced to half of what it had been initially). The first is a laboratory technique; the second deals with the measurement of pain in situ—namely, in the pathological conditions.

It is no wonder at all that the two methods do not always lead to the same results since in the first method the conceptual component is probably not nearly as important as in the second, naturalistic approach. When a person is suffering from an illness he has anticipations of pain which would produce a result that would hardly parallel the laboratory situation where no anticipation of pain resulting from illness is to be expected.

The evidence of sensory physiology continues to leave unresolved the question of whether pain may be considered as a separate sensory system with its own receptors and fibers or whether pain results from a special mode of activation of fibers which also respond to mechanical, thermal or other stimuli. If the controversy is resolved in favor of the latter alternative, there is a sense in which one might consider pain not as a sensation with which affective and conceptual components may be associated, but rather as a conceptual component from the very outset.
In any case, whenever the response to a stimulus depends heavily on past experience, as in the case of pain, it is possible for the response to become emotionally toned. By this we mean that there are other elements besides the stimulus itself which account for the eventual response and that the level of the sensory threshold is hardly sufficient for explaining the kind of response obtained. From this point of view pain may be regarded as an emotion, since it is heavily laden with past experience. Thus any methods which will attempt to reduce pathological pain by eliminating anxiety and similar expectations will have results which cannot be paralleled by the experimental approaches to pain. This is essentially what Dr. Beecher has been arguing for. That the conceptual component operates also in the case of experience with pain in animals is demonstrated by the investigation of Hill, Bellevielle and Wikler.\(^1\) They demonstrated that an animal which has learned to respond to a warning signal for an impending shock by reducing its bar pressing will ignore the warning signal after being injected with morphine and continue its bar pressing rate as if no warning signal had been given. Thus the effect of morphine is to interfere with the memory of the previous experience or with the attitude towards it; and when the effects of morphine have worn off, the effectiveness of the warning signal returns and the animal reduces its rate of bar pressing again during the warning signal. On the other hand, Verhave\(^2\) demonstrated that the injection of 10 mg. of morphine per kg. of body weight tends to eliminate avoidance responses but not escape responses. Is it possible that the escape response is so closely attached to the painful stimulus that it depends less on previous memory while the avoidance response must depend basically upon stored memories?\(^3\)

Another example of the conceptual component in pain arises from the consideration of intractable pain. An examination of the degree of pain as measured by the number of doles indicates that intractable pain is of a rather low order of pain and the only reason why it is so unbearable is not the intensity of the pain but its duration and unavoidability—a conceptual component. It is further interesting to note that frontal lobotomy will relieve the pain though it doesn’t alter the sensory threshold for pain. This indicates that it is the anxiety of the pain that is reduced and not the sensory level.

Dr. Fisher and Pasamanick present a very good case for exploring the sense of taste as a probe for personality and disease indicators. Since taste sensitivity is a more subtle characteristic than some of the other behavioral indicators, it probably suffers less change induced by
cultural and social factors. Furthermore, it seems to have, at least in
the case of taste, for some substances, a rather high genetic loading.
This permits the use of this modality as a basis for developing personality
types as well as disease-prone types. It is quite likely that such
psychochemical investigations may prove to be a greater source of
knowledge about behavior and personality than psychophysical investiga-
tions. Since most of the psychophysical experiments hardly touch the
surface of the receptors, their effect in eliciting basic behavior may
be very mild compared to psychochemical influences, and psycho-
chemistry may replace psychophysics as a more powerful tool in
behavioral investigations.

One wonders, however, whether the single positive correlation
between taste threshold and the digit-symbol test found by Fisher and
Pasamanick is to be regarded seriously. One would like to know how
many other correlations with the Wechsler-Bellevue subscores were
computed before the deviation score was selected. Was this a single
chance finding or does it represent a serious result? If so, one would
have to provide some rationale for the relationship between digit-symbol
substitution and taste threshold.

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