PSYCHOPHYSICAL VALIDITY OF THE REASON SCALE OF DIFFERENT TYPES OF PAIN

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Abstract

The objectives of this study was to scale the different types of existing pain, comparatively, employing Magnitude Estimations and the Expanded Category Estimations, to verify whether the order of the intensity degrees of the resulting pain of the two psychophysical methods are similar; to confirm whether the variability of the expanded category estimations increases linearly in function of the increase in the category estimations, such as it occurs with the magnitude estimations. Participants: 30 outpatients, 30 physicians and 30 nurses. The psychophysical scale of the different types of pain in these groups was validated with the exponent of 1,65 for patients, 1,17 for the physicians and 1,14 for the nurses. Kendall's (W) coefficient applied to the estimates for each method for the different pain resulted in W=0,74 (patients), W=0,81 (physicians) and W=0,74 (nurses), which indicates that the rank order derived from the estimates is highly concordant for the three groups.

Researches about the pain phenomena are more and more focused on an ample nowledge of the different complexities of this phenomenon, this occurs when the understanding of the other aspects of pain not only biological, but also behavioral, perceptual, social, cultural, and the meaning of each are considered.This knowledge is fostered by understanding the importance that each of the aspects possesses in response to pain, and even more, in the utilization of reliable research methods, since measurinng subjetive phenomena, such as sentiments and sensations need measurements that are more precise.

NOBLE N et al, (2005) analyzed the history of pain mensuration and identified three fields of activity: psychophysical, multidimensional questionnaires where standardized descriptors were utilized, and pain intensity scales. It has been accounted that thes historical concerns stemmed from the necessity to establish reliable, validated and sensitive measures to determine the efficacy of analgesics and other therapies for pain.

Psychophysical scaling yields mensurations that are more precise, in which not only are the differrencess established, but also how an attribute is more intense than the other.

According to STEVENS(1975), the value of an exponent provides information about the basic properties of "input-output" of the sensorial and perceptual dimension in diiscussion, this characterizes the rate at which an "output" system , labeled through sensation grows as a function of the "input" stimulation.

This method has relevant characteristics as a mensuration strategy for subjective concepts such as pain. HINSHAW(1978) and SENNOTT-MILLER et al, (1988) highlighted some of these characteristic, such as : the construction of scales in the reason level increases the sensitivity of the mensuration; the constructed scales and the given judgments are stable registers of test-retest and reliable coefficient close to 0,908; the cognitive modalities – magnitude estimations and line-lengths- can be easily used by the health care professionals; the method is cost-saving since there are no data losses, and the data may be collected individually or in groups.

Pain mensuration has been considered a great challenge for those who wish to control it adequately, for it is understood as a complex perceptual experience, individual and subjective, which can be quantified only indirectly. Ever since it has been operationalized in various manners in the investigative domains with animals and humans in the laboratory or in clinical situations, the integration of knowledge originated from these domains has increased.

The search for how the phenomenon is painful, and how it is perceived by whom feels it, and by whom treats it is the outcome of the principal objective which the professionals of this field have and attempt to tailor the treatment accordinng to the origin of the pain free of the personal interferences in this process. Owing to this, there are several papers in the psychophysical field with regards to the discernment of the painful perception and the mensuration of clinical pain (GIRDLER et al, 2005,, HARTMANNSGRUBER et al, 2003, SANT´ANNA et al, 2004, HORTENSE et al, 2002)

In this study, we will apply a psychophysical method in order to learn more about the perceptual and subjective phenomena.

-To scale the different types of existing pain comparatively employing two different psychophysical methods (Magnitude Estimations, and Expanded Category Estimations).

-To verify whether the order of the pain intensity degrees resulting from both of the psychophysical methods are comparative.

-To confirm whether the variability of the expanded category estimates increase linearly in function of the increase of hte category estimates, as it occurs with the magnitude estimates.

PAIN MENSURATION

Experiment- A comparison between the psychophysical scaling methods of magnitude estimations and expanded category estimations.

In the magnitude estimation method, the subject selects and uses an amplitude of numbers which represent a subjective amplitude. On the contrary, in the category estimations, the tester randomly selects the amplitude of the category, generally lower (although many times it may be higher) than the amplitude naturally selected by the subject in the magnitude estimations method (unlimited amplitude). If the natural expression for the numeric relation between the estimates of a number of stimuli relies on the amplitude or the number of categories available, the typical category estimation methods(limited amplitude) may constrain the subject´s judgment. Therefore, category estimates do not represent the increase of the subjective estimates as do the magnitude estimates, resulting in a non-linear relation between them. (GUIRAO, 1987; 1991)

Method

Participants: This study was comprised of 30 outpatients from diverse specialized clinics, 60 health professionals (30 physicians, and 30 nurses). All of the subjects were unaware of the purpose of the experiment.

Material: A notepad containing specific instructions on the first page for each types of ppsychophysical method, and in the following pages a list of 20 different types of pain and their respective definitions, and a pen.

Procedure: Numeric magnitude estimation methods and expanded category methods were utilized. The task of the participants for the magnitude estimation method consisted in assigning a number for each type of pain, in comparison with the standard stimulation, which was Lumbago, with a numeric value of 100. For instance, if the participant deemed that one type of pain was twice as intense as Lumbago, then a number twice as that should be marked, or rather, 200. Had the participants considered one type of

pain half the intensity of Lumbago, then a number half of that value should be marked, 50. The participants established the the estimates, one for each type of pain.

In the second method, the task of the participants was to determine a category that varied according to the amplitude of the geometric measures of the magnitude estimations for the different types of pain obtained in the previous study, (HORTENSE et al, 2004) that is, it varied from 0 to 380. In this manner, if the participants deemed that a given type of pain was more intense compared to the others, then he should assign this as the maximum category, or rather, 380. If he deemed that one type of pain was less intense, the minimum category should be assinged 0.The participant should ascribe to the others the intermediary categories from 1 to 379 to indicate   the intermediary degrees of pain intensity.

There were separate groups of subjects for each scale, that is, for each sample, 15 participants judged the magnituude estimations, and the other 15 judged the expanded category estimations. The types of pain were presented in a random order for each participant.

RESULTS AND DISCUSSION

The geometric medians and the standard deviation were calculated from the geometric medians of the magnitude estimations deemed by the subjects, in addition to the arithmetic medians and the standard deviation for the arithmetic medians of the expanded category estimations. As well as that, the rank order of the judgment for pain intensity resulting from each scaling method was performed. Additionally, the exponent function and Kendall´s (W) coefficient was calculated.

Table 1 indicates the types of pain with greater intensity, both for the Magnitude Estimations and the Expanded Categor Estimations for the group of outpatients, the group of physicians, and the group of nurses. The results demonstrate equivalence in the responses for both of the methods used, intense pain, as well as acute   and chronic pain was considered.

Table 1. Rank order, Geometric Median of the Magnitude Estimations(ME) and the Arithmetic Median of the Expanded Category attributed to the different types of pain concerning the estimates with greater attribution obtained from the outpatients, physicians and the nurses.

		Outpatients		
RO	**Types of pain**	**ME**	**Types of pain**	**EC**
1	Cancer pain	300,23	Acute infarct of the myocardium	354,67
2	Renal colic	287,50	Cancer painr	325,87
3	Acute infarct of the myocardium	275,42	Renal colic	315,80
4	Pain from AIDS	254,09	Fibromyalgia	308,67
5	Labor pain	232,37	Labor pain	304,53

		Physicians		
RO	**Types of pain**	**ME**	**Types of pain**	**EC**
1	Renal colic	448,57	Labor pain	304,00
2	Cancer pain	442,36	Renal colic	286,67
3	Acute infarct of the myocardium	405,35	Cancer pain	276,00
4	Labor pain	365,02	Acute infarct of the myocardium	270,67
5	Pain from burns	279,11	Trigeminal pain	215,33

		Nurses		
RO	**Types of pain**	**ME**	**Types of pain**	**EC**
1	Cancer pain	511,36	Cancer pain	336
2	Acute infarct of the myocardium	446,18	Renal colic	329,33
3	Renal colic	329,13	Labor pain	302
4	Pain from burns	262,57	Acute infarct of the myocardium	278
5	Labor pain	244,62	Pain from burns	256,67

Kendall´s (W) concordance coefficient applied to the estimates of each method (Magnitude Estimatons and Expanded Category Estimations), and to the different types of pain was W=0,74 for the group of patients, W=0,81 for the group of physicians, and W=0,74 for the group of nurses, indicating that the rank order derived from the estimates is highly concordant in the three groups studied.

In Figure 1, the geometric medians of the numeric estimates for the group of outpatients are in logarithmic coordinates in function of the corresponding geometric medians of the expanded category estimates for each type of pain. A straight line with an inclination (the exponent of the power function) of 1,65 was constituted.Thus, since the observer was likely to restrain the amplitude if the adjustments in funtion of the variable he controlled, in Figure 2 those medians were projected in inverted coordinates, that is, the expanded category estimates in function of the numeric correspondent for each type of pain with an inclination of the straight line of 0,46.

The psychophysical scale for the different types of pain for the group of outpatients was validated with the exponent of 1,65 (magnitude estimation in function of line-lengths), and 0,46 (line-length in function of the magnitude estimations), having a geometric median of 0,86, very close to 1,00, or rather, the predicted exponent of 1,00 when the expanded categories and numeric estimates r^2=0,76; were employed.

Relation between the geometric median logarithms of the magnitude estimations end the expanded category logarithms to the different types of pain, for the outpatients.

Relation between the geometric median logarithm of the expanded category estimations and magnitude estimation logarithms attributed to the different types of pain, for the outpatients.

Due to the space, solely the chart for the outpatients will be presented. Nevertheless, it can be made noteworthy that the psychophysical scale for the different types of pain for the group of physicians and the group of nurses was validated, in which the exponent, a geometric median, was 1,17 for the group of phyicians, and 1,14 for the group of nurses, both of which were close to 1,00, that is, the predicted exponent of 1,00 utilizing the expanded category and numeric estimates was r^2=0,90.

FINAL CONSIDERATIONS

The relation between the magnitude estimations and the expanded category estimations is a function of the power of an exponent insignificantly different from 1,00. The concordance between these scale values is high, indicating that the scales are homogenous and consistent.

There are two main problems when employing the category scales. First, owing to the number of categories with which the stimuli are judged, it is fixed, and the method leads to serious biases.As a result, the category scales are particularly sensitive to the effects of the context, such as the amplitude of the categories and the frequency of the stimuli. In the case of pain mensuration, a greater source of error has caused the examinee constraint by having been imposed an anchor (superior limit) at the end of the continual pain (that is, the mensuration scale of pain). Second, the category scales do not allow statements about the reason of the differences among the measurements of pain obtained. It is significant to state that one measurement is greater than another one or subtracted by one another, yet, it is unlikely to infer how many times a measurement is greater or less than the othe (FALEIROS SOUSA & DA SILVA, 2005).

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