

SOCIAL PERCEPTION OF NURSING PROFESSIONAL ASSESSED BY DIFFERENT SCALES

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The purpose of this experiment was to scale the social perception of nurses through the methods of magnitude estimation, category estimation and cross-modality matching (line lengths). The study participants were high school and undergraduate students, active and retired medicine, psychology, nursing and dentistry professionals. Results revealed that: (1) the characteristics neat, responsible, clean, careful and efficacious occupied the first positions in terms of nurses' social perceptions, while useless, shameful, dishonest, irresponsible and hateful occupied the last positions on all scales obtained by the different direct psychophysics methods; (2) the scale of nurses' social perception is valid, stable and consistent and (3) the rankings resulting from the three methods produce highly concordant positions of perception for the different adjectives.

DESCRIPTORS: social perceptions; psychophysics; scales

PERCEPCIÓN SOCIAL DE PROFESIONALES DE ENFERMERÍA EVALUADA MEDIANTE DIFERENTES ESCALAS

La finalidad de este experimento fue la de escalonar la percepción social del enfermero a través de los métodos de estimación de magnitudes y emparejamiento cruzado (a lo largo de líneas). Participaron del estudio estudiantes de 2º grado y universitarios, profesionales actuantes y jubilados de medicina, psicología, enfermería y odontología. Los resultados mostraron: (1) los trazos aseado, responsable, limpio, cuidadoso y eficaz ocupan las primeras posiciones en términos de percepción social del enfermero, mientras los trazos inútil, deshonroso, deshonesto, irresponsable y odioso ocupan las últimas posiciones en todas las escalas obtenidas por los diferentes métodos psicofísicos directos; (2) la escala de percepción social del enfermero es válida, estable y consistente y (3) las ordenaciones resultantes de los métodos producen posiciones de percepción altamente concordantes para los diferentes adjetivos.

DESCRIPTORES: percepción social; psicofísica; escalas

PERCEPÇÃO SOCIAL DE PROFISSIONAIS DE ENFERMAGEM AVALIADA POR MEIO DE DIFERENTES ESCALAS

O objetivo deste experimento foi escalonar a percepção social do enfermeiro pelos métodos de estimação de magnitudes e de categorias e de emparelhamento intermodal (comprimento de linhas). Participaram estudantes do 2º grau e universitários, profissionais atuantes e aposentados em medicina, psicologia, enfermagem e odontologia. Os resultados mostraram que (1) os traços aseado, responsável, limpo, cuidadoso e eficaz ocupam as primeiras posições em termos da percepção social do enfermeiro, enquanto os traços inútil, desonroso, desonesto, irresponsável e odioso ocupam as últimas posições em todas as escalas obtidas pelos diferentes métodos psicofísicos diretos; (2) a escala de percepção social do enfermeiro é válida, estável e consistente e (3) as ordenações resultantes dos métodos produzem posições de percepção altamente concordantes para os diferentes adjetivos.

DESCRIPTORES: percepção social; psicofísica; escalas

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INTRODUCTION

The magnitude estimation method has been successfully used to measure the severity of different diseases. A list of 126 diseases was elaborated and sent by mail to two distinct samples: one non-medical and the other medical. The participants' task was to estimate the magnitude of the diseases' severity, indicating a number proportional to 500, which was the score designated to peptic ulcer, to each disease. Some examples of the diseases are: intestinal constipation, headache, diarrhea, sinusitis, acne, astigmatism, menopause, menstruation, eczema, medication allergy, gonorrhea, coma, depression, epilepsy, cerebrovascular accident, heart attack, uremia, cancer and leukemia. We found high levels of agreement between both samples in terms of their magnitude estimates and respective orders. The results also indicated that the age, gender and civil status variables exerted a stronger effect on the non-medical than on the medical sample's judgments. When combining the magnitude estimates from both samples, we found that dandruff received the lowest estimate, abortion the median and leukemia the highest estimate⁽¹⁾. The same result pattern was found in other studies⁽²⁻³⁾.

In a similar study, the original research was replicated⁽⁴⁾, using another sample of physicians and analyzing estimates in function of medical specialties. The results showed no significant mutual differences among the numerical magnitude estimates by physicians from different specialties, except for five diseases, which indicated that the respondent's specialty is not a significant variable.

Another study⁽⁵⁾ looked at how physicians and nurses ranked the severity of 68 surgical clinical conditions through the magnitude estimation method. Data revealed that **aortic aneurysmectomy**, **cerebral aneurysmectomy** and **coronary artery bypass grafting** were considered as the most severe, while **adenoidectomy**, **tonsillectomy** and **uterine curettage** were estimated to be the least severe clinical-surgical conditions in all scales obtained through different direct psychophysical methods; the non-metrical severity continuum of clinical-surgical conditions has prothetic characteristics; the relation between dynamometric force and line length matching estimates is a power function whose exponent is not significantly different from 0.77 and, finally, the severity ratio scale of clinical-surgical conditions is valid, stable

and consistent, as the exponent obtained by line length and dynamometric force matching was not significantly different from the exponent predicted by the scales' transitivity characteristic, that is, from the exponent obtained in the calibration tasks⁽⁶⁻¹⁰⁾.

Based on an earlier study⁽¹¹⁾, we selected fifteen adjectives that characterize the nursing professional in our society, five of the highest power, five neutral and five of the lowest power. These adjectives were ranked by the category estimation method.

In this experiment, these adjectives were ranked by the magnitude estimation and intermodal matching methods, involving the line length response continuum, besides the category estimation method.

This experiment's general objective was to rank the social perception about nurses through different scales. The specific objectives were: (1) To compare the scales derived from interval judgments (category estimates) with the scales derived from ratio judgments (magnitude and line length estimates); (2) To verify, through the comparison between the magnitude (and line length) estimates and the category estimates whether the non-metrical social perception continuum has prothetic or metathetic characteristics; (3) To verify if the social perception degree orders derived from the three psychophysical methods are mutually similar; (4) To validate the ratio scale derived for the non-metrical social perception continuum through the intermodal matching method. As we mentioned in the introduction, this method provides criteria for this purpose and, as a consequence; (5) To verify the stability and/or equivalence of the ratio scales produced through three different response modes, i.e. unlimited numerical (magnitude estimates), visual (line lengths) and limited numerical (category estimates) and (6) To verify the stability and/or equivalence of these ratio scales among the four samples. For this purpose, we compared the empirical exponent derived from the social perception estimates about nurses with the exponent predicted by Stevens through countless psychophysical methods.

METHOD

Participants. The sample consisted of 204 persons: 56 second and third-year high school students; 44 undergraduate students in nursing,

medicine, psychology and dentistry, 56 active professionals (nurses, physicians, psychologists and dentists) and 48 retired nursing, medical, psychology and dentistry professionals. The latter two came from different specialty areas. Six other participants were eliminated because they did not understand the instructions, as proved by the very low determination coefficients (r^2) calculated for each participant. All participants came from Ribeirão Preto. Their ages ranged between 18 and 75 and they were not aware about the goals of the experiment. Table 1 shows the number of participants/used method/professional category.

Material. We elaborated two blocks, the first page of which contained specific instructions for each type of psychophysical method and the following pages a list of 15 personality traits, resulting from an earlier study⁽¹¹⁾, and their respective definitions, a tape measure of 3m length and 10cm width (brand Lufkin) and a pen.

Procedure. We used the methods of category estimation, magnitude estimation and intermodal matching, involving the line length response continuum. In the procedure used in the category estimation method, participants' task was to attribute a score to each trait, ranging from 0 and 6, in function of its pertinence to characterize nurses in our society. Participants were instructed to concede the maximum score of 6 to the most attributed trait and the minimum score of 0 to the least attributed. The other intermediary scores (from 1 to 5) should be used to indicate intermediary usage levels of the traits to characterize nurses. The most and least attributed traits had not been previously established. Each participant established only 15 estimates, one for each personality trait selected from the earlier study⁽¹¹⁾. These were the 5 most attributed, the 5 neutral and the 5 traits least attributed to nurses.

In the second method, participants' task was to attribute a score to each trait, proportional to the quantity of that adjective's definition in relation to nursing professionals in our society. Thus, if the participant considered that a given adjective defined nurses two times more than another one, (s)he should attribute a score twice as high. On the other hand, if (s)he judged that a given adjective has only half the pertinence of another adjective, (s)he should attribute a score half that of the other adjective. The different adjectives were presented in a series of fifteen, displayed one by one on separate cards, in a random

order for each participant. Each participant established 15 estimates, one for each adjective. No standard stimulus and module were previously designated.

When applying the intermodal matching method, involving the line length response continuum, participants' task was to match a line length with each adjective that was proportional to the quantity of that adjective's definition in relation to nursing professionals in our society. For example, if the participant considered that a given adjective defined nurses two times more than another one, (s)he should match a line length that was two times longer. If (s)he judged that a given adjective corresponded to half the definition of nurses in comparison with another adjective, the participant should match a length half as long as for the other adjective. No standard stimulus and module were previously established. The different adjectives were presented in a series of fifteen and displayed one by one on separate cards, in a random order for each participant. Each participant established 15 estimates, one for each adjective.

Independently of what psychophysical method was used, the instructions participants received required judgments to be made in terms of the adjectives a majority of the population attributed to nursing professionals. The samples were independent and consisted of 204 participants: 56 high school students, 28 of whom made their judgment through the category estimation method and 28 through magnitude estimation and line length matching; 44 college students, 22 of whom reached their judgment through category estimation and 22 through magnitude estimation and line length matching; 56 active professionals, 28 of whom made their judgment through the category estimation method and 28 through the magnitude estimation and line length matching methods; and 48 retired professionals, 24 of whom reached their judgment through category estimation and 24 through magnitude estimation and line length matching. The experiment was carried out at a laboratory and all participants reached their judgments individually.

RESULTS AND DISCUSSION

Independently of what psychophysical method was used, the traits **neat**, **responsible**, **clean**, **careful** and **efficacious** were the most attributed

adjectives, while **useless, dishonest, shameful, irresponsible** and **hateful** were the least attributed ones. In fact, Kendall's coefficient of agreement (W) showed high agreement levels among the various samples as to the ranking of these different traits. The coefficients of agreement corresponded to $W=0.93$ for the CE method, 0.95 for ME and 0.95 for LLM, all of which highly significant ($p<0.001$).

As a consequence of these high agreement levels between different samples' judgments, all participants' estimates were grouped for each method (Table 1). It can be clearly observed that, considering each method, the orders were not substantially different from those produced by the different samples. Like before, **neat, responsible, clean, careful** and **efficacious** were the most attributed traits (adjectives), while **useless, shameful, dishonest, irresponsible** and **hateful** were the least attributed ones.

Table 1 - Arithmetic means of category estimates (CE), geometrical means of magnitude estimates (ME), geometrical means of line length matching (LLM) and order of positions (OP) attributed to each trait, considering all samples together

Traits	CE	OP	ME	OP	LLM	OP
Neat	5.57	1 ^o	17.76	1 ^o	12.81	3 ^o
Responsible	5.42	2 ^o	17.46	2 ^o	12.90	1 ^o
Clean	5.36	4 ^o	17.05	3 ^o	12.08	5 ^o
Careful	5.40	3 ^o	16.83	4 ^o	12.22	4 ^o
Efficacious	5.09	5 ^o	15.53	5 ^o	12.85	2 ^o
Unsatisfied	2.15	10 ^o	6.67	7 ^o	5.60	7 ^o
Learned	4.16	7 ^o	4.10	10 ^o	3.45	10 ^o
Delicate	4.25	6 ^o	8.03	6 ^o	7.48	6 ^o
Thoughtful	3.70	8 ^o	5.34	8 ^o	4.96	8 ^o
Temperamental	2.67	9 ^o	4.62	9 ^o	4.09	9 ^o
Hateful	0.43	11 ^o	1.21	12 ^o	1.09	14 ^o
Irresponsible	0.35	12 ^o	1.32	11 ^o	1.30	11 ^o
Dishonest	0.35	13 ^o	1.17	13 ^o	1.13	12 ^o
Shameful	0.31	14 ^o	1.17	14 ^o	1.12	13 ^o
Useless	0.22	15 ^o	1.15	15 ^o	1.06	15 ^o

An agreement coefficient applied to the estimates reached by each method, for the fifteen adjectives, resulted in $W=0.96$ ($p<0.001$), which indicates high agreement levels among the estimate orders achieved by each methods. For example, the adjective **useless** occupies the 15th position and **responsible** the 4th position in all response continua.

In order to verify whether the social perception continuum had prothetic or metathetic characteristics, as happens with additive sensory continua, the adjectives' arithmetic means of category estimates were projected in function of the geometrical means of magnitude estimates and in function of the

mean line length matching. In linear coordinates, the relation between these estimates (category estimates X magnitude estimates and category estimates X line length matching) showing a slightly downward concavity. Moreover, when the arithmetic means of the category estimates were projected in function of the logarithms of the magnitude estimates' geometrical means and in function of the logarithms of the line length matching's geometrical means, the relation showed an upward concavity. Figure 1 clearly shows these relations in linear coordinates and Figure 2 in mono-logarithmic coordinates. When considered jointly, it is demonstrated that the social perception continuum has prothetic or additive characteristics.

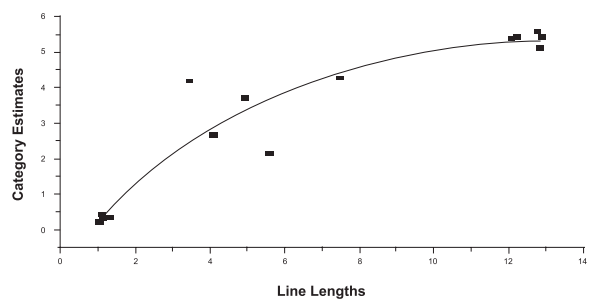


Figure 1 - Relation between arithmetic means of category estimates and geometrical means of line length matching of nurses' social perception in linear coordinates

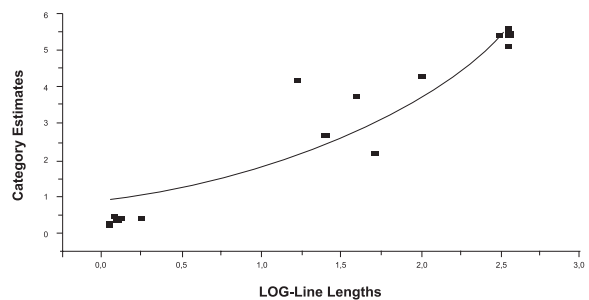


Figure 2 - Relation between arithmetic means of category estimated and logarithms of geometric means of line length matching of nurses' social perception

Nevertheless, there are some differences in the obtained rankings. The category estimation method provides us with the order and the difference between the attribution degrees. Based on this method, we cannot affirm the extent to which the attribution degree of a given adjective is higher or lower in comparison with another adjective's degree. Through the magnitude estimation and line length matching

methods, we can obtain the order, the difference and, also, the ratios between the different adjectives' attribution degrees. Based on data presented in Table 1, for example, considering the arithmetic means of the geometrical means of the magnitude estimates for the five adjectives with the highest attribution degrees in comparison with the arithmetic means of the geometrical means of the magnitude estimates for the five adjectives with the lowest attribution degrees, we can affirm that the attribution degree of the adjectives that best characterized nursing professionals (ME=17.00) is approximately seventeen times higher than the attribution degree of the adjectives that least characterize these professionals (ME=1.00), or approximately three times higher than the attribution degree of the neutral adjectives (ME=6.00).

When using line length matching, the attribution degree of the adjectives that best characterize nursing professionals (LLM=13.00) is approximately thirteen times higher than the attribution degree of the adjectives that least characterize these professionals (LLM=1.00) or approximately two and a half times higher than the attribution degree of neutral adjectives (LLM=5.00). As a result of this ratio ranking, any other ratios between the scale scores can be reached between different adjectives' attribution degrees.

In Figure 3, the geometrical means of numerical estimates are projected in logarithmic coordinates in function of the corresponding geometrical means of line length matching for each trait (adjective). A straight line with an inclination (power function exponent) of 1.06 ($r^2 = 0.90$) was adjusted to these data through the least squares method. However, as the observer tends to restrict the range of his adjustments in function of the variable he controls, we projected these means in inverted coordinates in Figure 4, that is, the line length matching in function of the corresponding numerical estimates for each adjective. This "regression effect" has been found in different experiments and was analyzed⁽¹²⁾. The inclination of this straight line equals 0.91 ($r^2 = 0.99$). The geometrical means of the two inclinations can be an appropriate way of mediating the regression effect⁽¹³⁾. In this case, the geometrical mean of 1.06 and 0.91 is 0.98. None of these inclinations, neither in Figure 3 nor 4, was significantly different from the predicted value of 1.00.

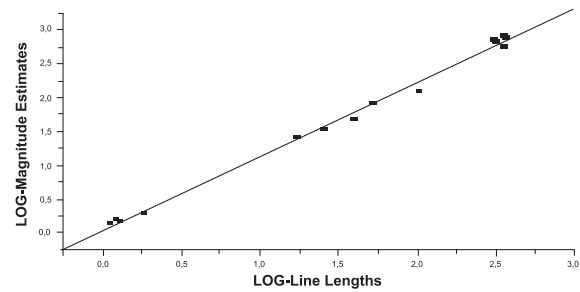


Figure 3 - Relation between logarithms of geometrical means of magnitude estimates and logarithms of geometrical means of line length matching of nurses' social perception

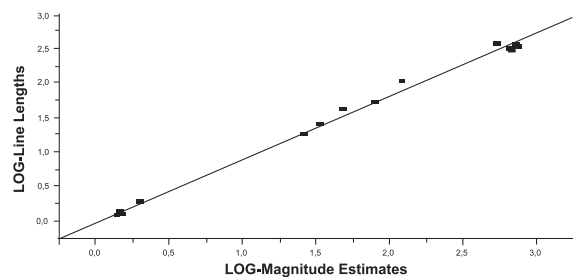


Figure 4 - Relation between logarithms of geometrical means of line length matching and logarithms of geometric means of magnitude estimates of nurses' social perception

The mean exponent was 1.06 (see Figure 3). This mean value lies close to 1.00, which is the mean value predicted when line length matching and magnitude estimation are directly involved. Providing the equivalence between the empirical and predicted exponents in a calibration task that involves sensations between two modalities provides strong evidence about the validity of the magnitude estimation method and, consequently, the power law or Stevens' law. Both dynamometric force and line length have been frequently used as continua in intermodal matching tasks. The logic can be quite easily apprehended with line length. It has been consistently⁽¹²⁻¹⁴⁾ verified that numerical estimates of line lengths produce a power function whose exponent is very close to 1.00. In other words, line lengths are linearly proportional to physical lengths.

A study⁽¹⁴⁾ about undergraduate students' stress related to nursing care, which also verified this consistency between numerical estimates and physical lengths, validated the nursing care ratio scale through the intermodal matching method. The students themselves judged fifteen types of nursing care, and considered

permanent vesical probing as the most stressful and temperature taking as the least stressful type of care.

Measurement constitutes the framework of science. The study of measurement is the study of how to represent empirical relations through mathematical structures. Thus, scientific evolution largely depends on the technical evolution of instruments researchers have at their disposal. A considerable amount of scientific discoveries in humanity can be directly attributed to the discovery or improvement of observation and measurement instruments⁽¹⁵⁾. Nursing is inserted in this context as a profession that needs to base its clinical practice on knowledge acquired through research with consistent and reliable results. This study established the characteristic traits of nurses, that is, the social perception about nurses was demonstrated through the psychophysical measurement method, proving its consistency.

CONCLUSIONS

Data from the experiment carried out in this study lead to the following conclusions: (1) the traits **neat, responsible, clean, careful** and **efficacious** occupy the first position in terms of social perception about nurses, while **useless, shameful, dishonest, irresponsible** and **hateful** occupy the last positions in all scales obtained through different direct psychophysical methods; (2) the ranking resulting from all methods produce social perception positions about

nurses with high agreement levels for the different adjectives; (3) the non-metrical social perception continuum has prothetic characteristics; (4) the variability of the estimates, indicated by the geometrical standard deviation, is a linear function of the mean magnitude (or line length matching) estimates; (5) the relation between the magnitude and line length matching estimates is a power function whose exponent does not significantly differ from 1.0 and, finally (6) the scale of social perceptions about nurses is valid, stable and consistent, as the exponent obtained through line length matching and magnitude estimates was not significantly different from the exponent predicted by the scales' transitivity characteristic, that is, from the exponent predicted by Stevens through countless psychophysical methods.

In summary, the results provide a ratio measurement scale of social perceptions about nurses which is valid, stable and consistent. In summary, the ratio scale of social perception about nurses, based on the judgments obtained for the four different samples, evidences that the social perception consists of a block of adjectives that constitute the nursing professional stereotype: **neat, responsible, clean, careful** and **efficacious**. The traits that least characterize the nurse, on the other hand, are: **useless, shameful, dishonest, irresponsible** and **hateful**. The agreement level between the scale scores obtained through different psychophysical methods is high, indicating that the scales are homogeneous and consistent.

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