Short version of the "job stress scale": a Portuguese-language adaptation

Márcia Guimarães de Mello Alves[a], Dóra Chor[b], Eduardo Faerstein[c], Claudia de S Lopes[c] e Guilherme Loureiro Werneck[d]

[a]Escola Nacional de Saúde Pública (ENSP). Rio de Janeiro, RJ, Brasil. [b]Departamento de Epidemiologia e Métodos Quantitativos em Saúde da ENSP. Rio de Janeiro, RJ, Brasil. [c]Departamento de Epidemiologia da Universidade do Estado do Rio de Janeiro. Rio de Janeiro, RJ, Brasil. [d]Núcleo de Estudos em Saúde Coletiva da Universidade Federal do Rio de Janeiro. Rio de Janeiro, RJ, Brasil

Keywords
Stress. Work. Reproducibility of results. Environment and health.

Abstract

Objective
To describe the adaptation to Portuguese of the short version of the "job stress scale", originally in English.
Methods
We evaluate six aspects of equivalence between the original scale and the Portuguese version: conceptual, semantic, operational, item, measurement, and functional equivalences. A reliability test-retest study was conducted with 94 selected subjects.
Results
Reproducibility (interclass correlation coefficients) for the 'demand', 'control', and 'social support' dimensions of the scale was estimated at 0.88, 0.87, and 0.85, respectively. Internal consistency (Cronbach's alpha) estimates for these same dimensions were 0.79, 0.67, and 0.85, respectively.
Conclusions
*Our results suggest that the adaptation of the scale was successful, and indicate that its use in the sociocultural context of the studied population (*Pró-Saúde *survey) is appropriate.*

INTRODUCTION

The use of measurement scales in epidemiological studies allows us to evaluate constructs such as stress. The first studies to associate stress in the workplace with health-related outcomes (with emphasis on heart diseases) go back to the early 1960's.[12]

Robert Karasek was one of the pioneers in the research of workplace social relations, stress-generating sources, and their repercussions on health. In the 1970's, Karasek proposed a bi-dimensional conceptual model which related two aspects – demand and control in the workplace – to risk of disease. 'Demand' refers to pressure of psychological nature, be it quantitative – e.g. time and speed in performing tasks – or qualitative – e.g. conflict between contradictory demands. 'Control' refers to job decision latitude, the possibility a worker has of employing his or her intellectual abilities in performing job-related tasks, as well as the degree of authority the worker has for making decisions about how to perform such tasks.[13,14] The Karasek model focuses on the work organization.

According to this model, mean scores are allocated into four quadrants, so as to express the relationships between demand and control (Figure 1). The coexistence of great psychological demands and low control over the work process would result in high job strain, with deleterious consequences to health. The scenario combining low demand and low control is also harmful (passive work), since it can generate loss

Correspondence to:
Dóra Chor
Escola Nacional de Saúde Pública - Fiocruz
R. Leopoldo Bulhões, 1480 8º andar Manguinhos
21041-210 Rio de Janeiro, RJ, Brasil
E-mail: dorinha@ensp.fiocruz.br

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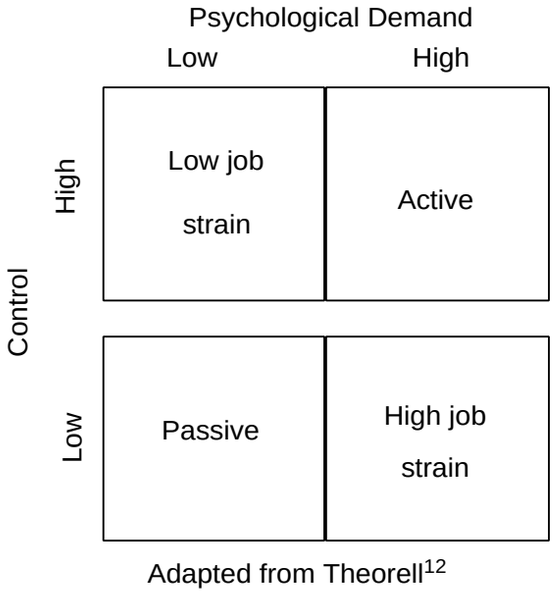

Figure 1 - Scheme of Karasek's Demand/ Control model.

of abilities and lack of interest. On the other hand, when great demands and high control coexist, workers experience the work process in an active fashion: though the demands are excessive, they are less harmful since the worker can plan work hours according to his or her biological rhythm and create strategies to deal with eventual difficulties.13 The 'ideal' scenario, low job strain, combines low demand and high control of the work process.

A third dimension, social support in the workplace, was added to the model by Johnson, in 1988.[14] This dimension is concerned with the level of social interaction between worker and colleagues/superiors.[5] Lack of support may also generate negative consequences to health.

A short version of Karasek's 49-question questionnaire was designed in Sweden by Töres Theorell in 1988, comprising 17 questions. Of these, five questions evaluate demand, six, control, and six, social support. The adaptation of this short version*is the main subject of the present paper. The original form of the scale is presented in the first part of Table 3 below.

The section on demand includes four questions related to quantitative aspects such as time and speed for performing tasks, and one question evaluating a predominantly qualitative aspect of the work process, related to the conflict between different demands.

The section on control includes four questions related to the use and development of abilities, and two related to decision latitude in relation to the work process. For both dimensions, the answer options are presented in a Likert-type scale (1-4), ranging between "frequently" and "never/almost never".

The section on social support comprises six questions about the worker's relationship with colleagues and superiors, and includes four answer options arranged in a Likert-type scale, ranging between "strongly agree" and "strongly disagree".

A review of the use and/or adaptation of the job stress scale was carried out in the MEDLINE and LILACS databases. No studies on the adaptation to Portuguese of the short version of the scale, nor epidemiological studies in which this scale had been used were located in MEDLINE. LILACS included a single Brazilian epidemiological study on psychic disorders among female nurses[1] in which the author included a few questions derived from the full version of the demand-control-support scale.

The aim of the present article is to describe the process of adapting the Swedish short version of the Karasek scale to Portuguese. Adopting this instrument will contribute to the investigation, in the Brazilian context, of various health-related outcomes that may, in their causal mechanism, include a share ascribable to stress in the workplace.

METHODS

Adapting the scale

According to Herdman,[3] one must consider at least six dimensions of equivalence for adequately adapting an instrument to another language. *Conceptual* equivalence concerns the existence of the same concept in a similar context in both population groups (the one for which the scale was developed and the one in which it will be applied). Such equivalence can be investigated through literature reviews, by consulting specialists or segments of the general population, and through qualitative techniques such as focal groups. Once this dimension is deemed adequate, the remaining dimensions can be investigated. In general, concepts are investigated by means of questions or items, which must be equivalent in both languages (*item equivalence*). Item equivalence must be judged by specialists or by members of the target population. *Semantic equivalence* is concerned with the transfer of word meaning between languages and with obtaining a similar emotional effect on the respondent regardless of the language being used. *Operational equivalence* refers to the general makeup of the questionnaire, including instructions,

* The rights over this adaptation were granted by the author, Töres Theorell (personal communication).

mode of administration, and measurement methods. *Measurement equivalence* is evaluated based on the new version's psychometric properties. Finally, once equivalence between both scales is achieved for all previous dimensions, *functional equivalence* is said to exist between the two versions, that is, both measure the same concepts in different cultures.[8]

The process of adapting the job stress scale consisted of: reviewing both national and international literature databases for articles on prior adaptation/use; research in English and/or Portuguese dictionaries; translation and back translation (with evaluation of processes and results); probing for the solution of eventual doubts; and pre-tests and a test-retest reliability study. The stages of the process are presented Figure 2 and discussed in detail below.

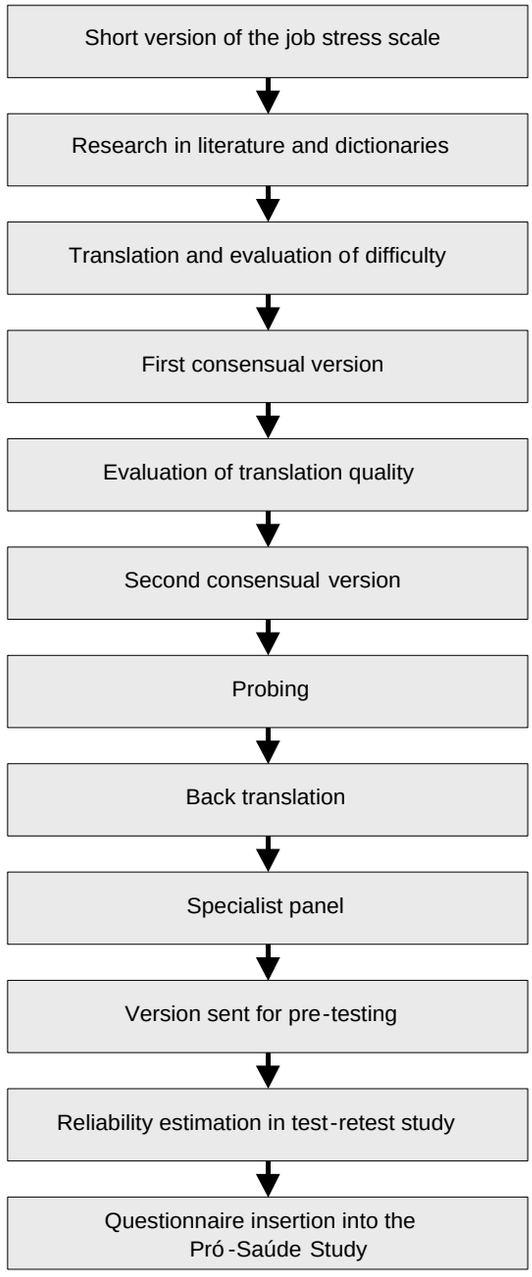

Figure 2 – Schematic representation of the process of adapting the short version of the "*job strees scale*".

English-Portuguese translation

Dictionary research showed that the Portuguese word *'estresse'* is an Anglicism based on the English word 'stress'. Its meaning is defined as "the set of bodily reactions to physical, psychic, infectious, or other types of aggression, capable of disturbing homeostasis".[15] The stress-causing agent is termed '*estressor*'. In English, stress is defined as the pressure or anguish resulting from physical or mental suffering or difficult situations. The adjective 'stressful' refers to the agent tending to induce stress.

'Trabalho' ('work', 'job') is a term of universal usage. In Portuguese, it designates "coordinated activity, of physical and/or intellectual nature, necessary for carrying out any task, service, or enterprise" and "the exercise of such an activity as an occupation, trade, profession, etc…".[9] According to Sociology, *'trabalho'* designates any human activity applied to the generation of wealth. In English, *'trabalho'* corresponds to two terms: 'work' or 'job', which mean, respectively, "the appliance of physical or intellectual activity for carrying out a task" and an individual's "occupation".[15]

The translation of the scale itself was carried out independently by three English-speaking Brazilian translators. Each translator received a document containing instructions on how to carry out the task. According to these instructions, emphasis should be given to the meaning of the terms (*semantic equivalence*) rather than to literal translation, both in headers and in questions and answer options. Furthermore, translators were instructed to attribute grades (from 0 – no difficulty to 10-maximal difficulty) and to comment upon the degree of difficulty of translating each question.

The first consensual version was defined in a meeting between the four study coordinators (specialists in Epidemiology) and the three translators.

Evaluation of the translations

The consensual version was compared to the English original by two external evaluators (Brazilian epidemiologists, experienced in the use of scales and fluent in English), who gave grades between 0 and 10. Items evaluated included *clarity of writing* (choice of words and their organization into sen-

tences), *use of colloquial language* (compatible with elementary schooling), and *equivalence in the meaning of questions and answers*. The evaluators suggested a few improvements in the translation.

Probing

The words or phrases for which no satisfactory translations were found were submitted to complementary probing,[2] which consists of submitting the translations to six respondents with varying degrees of schooling for comments.

Back translation

A new version including modifications suggested in the previous stages, was presented to two professional translators, who translated the Portuguese version back into English. These were native English speakers and were fluent Portuguese.

Evaluation of the back translation by a specialist panel

A workshop with a panel of five epidemiologists – experienced in the use of scales and fluent in both languages – compared the original English version, the last Portuguese translation, and the two back-translated versions.

Pre-testing

The version obtained at the end of the translation/evaluation process was approved for use in three rounds of pre-testing. The aim of each of the stages was to improve the entire questionnaire of Phase 2 of the *Pró-Saúde* Study, composed of seven thematic blocks with a total 82 questions, in addition to the adapted scale. The first pre-test (42 volunteers) was answered in groups, whose members filled the questionnaire in the presence of one of the team's researchers and evaluated it as to clarity of question formulation and difficulties found in answering specific questions, among other aspects. The alterations suggested were incorporated, and two other groups, with 33 and 31 voluntaries, respectively, answered the new pre-test following the same dynamics as in the first round. The time taken to answer the questionnaires was registered. All volunteers had similar characteristics to those of the study population.

Test-retest reliability study

Before fieldwork began, a pilot study (1st stage of the test-retest study) evaluated 101 staff members (see *study population*, below). Of these, 94 answered the same questionnaire (retesting) after seven days. This group was composed of professionals hired by the same university as the *Pró-Saúde* target population, but without permanent contracts.

Instrument stability and internal consistency

Two components of instrument reliability were investigated: its stability, through the intraclass correlation coefficient (ICCC), and its internal consistency, through the Cronbach's Alpha coefficient[11] (*measure equivalence*).

ICCC was estimated based on the answers of the 94 staff members who participated in the test-retest reliability study. For the evaluation of the level of stability of the answers we adopted the cutoff points suggested by Landis & Koch:[6] below 0= poor; 0 to 0,20= weak; 0,21 to 0,40= probable; 0,41 to 0,60= moderate; 0,61 to 0,80= substantial, and 0,81 to 1,00= almost perfect.

The Cronbach's Alpha coefficient evaluates the internal consistency or homogeneity of the questions (items) aimed at measuring a same construct. Coefficients were estimated for each dimension (demand, control, and support) among the 3,547 staff members participating in Phase 2 of the *Pró-Saúde* Study. A minimum value of 0.70 was recommended by Rowland[10] for considering that different items consistently evaluate a same construct.

Study population

After the adaptation process – described in the present paper – was completed, we inserted the short version of the job stress scale into a multidimensional self-administered questionnaire, used in Phase 2 (Sept. 2001 – March 2002) of the *Pró-Saúde* Study. This is a prospective study with a cohort of 3,574 technical-administrative staff of a Rio de Janeiro university. Phase 1 of data collection was carried out between August and October 1999.

RESULTS

In light of the universality of the concepts 'work' and 'stress', one can assume the existence of *conceptual equivalence* between both languages, a conclusion corroborated by the panel of specialists.

The format of the questionnaire was maintained (*item* and *operational* equivalences) with little alteration in individual items. A single new heading was introduced ("Now we have some questions about the characteristics of your work...") preceding the questions.

Semantic equivalence was sought throughout all stages of the translation process. In light of the grades

given by the translators to the degree of difficulty of each item, most items were easy to translate. The evaluators consistently considered the translation of most questions and answer alternatives as "almost perfect/ perfect" (data not shown).

The richness of the evaluation process and the later consensus obtained between translators and study coordination evidenced the greater possibilities generated by opting for the meaning-based rather than literal translation. For example, in the questions related to demand (D), the translation of the word 'intensively' in the question "Do you have to work very intensively?" (D2) generated doubts as to the meaning of intensity in work. In the discussion with the translators, it was not possible to achieve a consensus over this concept. It was thus necessary to resort to the literature in the field of Social Sciences in order to solve this doubt. Marx, in his book *Das Kapital*, writes that "the increasing intensity of work presupposes an increased expenditure of labor-power within the same period of time. Therefore, a more intensive work journey is translated into a greater amount of product than a less intensive journey of the same duration ... the same work journey generates a greater quantity of products".[7] In other words, the intensity of work is related to a greater amount of the product of work in the same amount of time. As a consequence of this reading, we chose to add, in parentheses, the sentence "(that is, produce a lot in little time)", absent in the original.

The item most difficult to translate, in the evaluators' opinion was the expression 'conflicting demands'. The first option considered was to translate it by using the terms *'conflitante´* ('conflicting') or *'contraditórias'* ('contradictory'). These terms were considered as confusing during pre-testing and probing. Our final choice was to include the phrase *'exigências contraditórias ou discordantes'* ('contradictory or discordant demands').

The translators disagreed as to certain items of the 'social support' dimension (A). For example, the phrase 'if I am having a bad day', considered as difficult to translate, had to undergo special probing. When translated literally, it asked if other people were understanding when the worker was having a '*mau dia*' ('bad day'). According to the respondents, this expression was not well regarded in our culture, as if the simple mention of the expression could bring bad luck. The interviewees suggested its substitution for the phrase '*não estar num bom dia'* ('not having a good day'), which was accepted.

During the probing stage, subjects made suggestions for more adequate versions of the eight questions.

Measurement equivalence results are presented in Tables 1 and 2.

Table 1 presents the results of answer stability in the test-retest study, which varied between 0.82 and 0.91, considering each dimension separately. As to the subdimensions, 'authority for making decisions' had the highest level of stability among men and women (0.70 and 0.54, respectively). Generally speaking, men showed greater stability in their answers than women, albeit this difference was not statistically significant.

Internal consistency values (Cronbach's alpha) ranged from 0.63 to 0.86 (Table 2). As to the subdimensions, the lowest values registered were for 'intellectual discerning' (0.57 for men and 0.55 for women).

DISCUSSION

Despite the conceptual equivalence of the terms *'estresse'* and *'trabalho'* in both languages, we cannot fail to consider, when analyzing the results of the

Table 1 - Intraclass correlation coefficients (*) of the dimensions of job stress, by sex and total.

Dimension	Men	Women	Total
Demand	**0.91 (0.84 – 0.95)**	**0.85 (0.75 – 0.91)**	**0.88 (0.82 – 0.92)**
Control	**0.91 (0.84 – 0.95)**	**0.82 (0.71 – 0.90)**	**0.87 (0.80 – 0.91)**
Intellectual discretion	0.89 (0.81 – 0.94)	0.83 (0.72 – 0.90)	0.87 (0.80 – 0.91)
Decision latitude	0.70 (0.51 – 0.83)	0.56 (0.33 – 0.73)	0.64 (0.49 – 0.74)
Social support	**0.88 (0.78 – 0.93)**	**0.84 (0.73 – 0.90)**	**0.86 (0.79 – 0.90)**

*CI 95%

Table 2 -Cronbach's Alpha coefficients for the dimensions of job stress, by sex and total.

Dimension	Men	Women	Total
Demand	**0.69 (0.75)**	**0.73 (0.80)***	**0.72**
Control	**0.63**	**0.63**	**0.63**
Intellectual discretion	0.57 (0.54)*	0.55 (0.70)*	0.56
Decision latitude	0.63 (0.76)*	0.70 (0.77)*	0.67
Social support	**0.86 (0.89)***	**0.85(0.89)***	**0.86**

*Values found for the original scale.[13]

Table 3 – Short version of the job stress scale.

Questionnaire about **Demands, Control and Support**
Demands (D) Often. Sometimes. Seldom. Never/almost never
D1. Do you have to work very fast?
D2. Do you have to work very intensively?
D3. Does your work demand too much effort?
D4. Do you have enough time to do everything?
D5. Does your work often involve conflicting demands?
Control (C) Often. Sometimes. Seldom. Never/almost never
C1. Do you have the possibility of learning new things through your work?
C2. Does your work demand a high level of skill or expertise?
C3. Does your job require you to take the initiative?
C4. Do you have to do the same thing over and over again?
C5. Do you have a choice in deciding HOW you do your work?
C6. Do you have a choice in deciding WHAT you do at work?
Support (A) Strongly agree. Mildly agree. Mildly disagree. Strongly disagree
A1.There is a calm and pleasant atmosphere where I work.
A2. We get on well with each other where I work.
A3. My co-workers support me.
A4. The others understand if I have a bad day.
A5. I get on well with my supervisors.
A6. I enjoy working with my co-workers.

*Cedida por Töres Theorell

empirical survey of stress in the workplace and health-related outcomes, the different forms of labor organization – including the different degrees of technological advancement, the importance of social rights, and the degree of organization of workers – as well as the general living conditions in the countries where the scale was used (Sweden and Brazil).

Throughout the different stages of the adaptation process, we were able to progress towards the obtainment of item, semantic, and operational equivalence.

The internal consistency of the questions surpassed the minimum level proposed by Rowland (0.70) in the demand and social support dimensions. It fell somewhat below this threshold in the control dimension. No expressive difference was found between men and women, except in the 'demand' dimension and in the 'decision latitude' subdimension, where vales for women were higher.

A comparison of the internal consistency values found in the study population to those estimated by Theorell[13] for Swedish workers (men and women in samples from the general population) shows that, in both populations, the lowest levels of consistency were found in relation to the 'intellectual discerning' subdimension.

Josephson et al[4] used the same scale in Sweden – including only the demand and control dimensions – and found Cronbach's Alpha coefficients of 0.69 and 0.51 for each of these dimensions respectively. These values were considered low by the authors. Values in the *Pró-Saúde* Study were higher (0.72 and 0.63, respectively).

The results obtained until now allow us to consider the existence of *measurement equivalence* between the two versions of the scale.

According to the adaptation scheme proposed by Herdman,[3] upon reaching the five previous types of equivalence, the scale can be considered as equivalent to the original version from the *functional* point of view.*

The adapted version of the job stress scale will allow for the investigation of associations between job stress and a number of health-related outcomes in Brazilian studies. The *Pró-Saúde* Study, for example, will include an investigation of the association of arterial hypertension (based on the measurements performed) with job stress.

The adapted scale does not contemplate all aspects inherent to the workplace environment. The authors of the scale never had the pretension of covering this totality, and explicitly stated so.[5] The scale allows us, however, to explore certain dimensions of stress in this specific environment, which may be complemented by the use of other scales and by qualitative studies.

*The Portuguese form of the scale is presented in the Revista de Saude Publica 2004;38(2):164-71.

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