COMPARISON BETWEEN FRENCH AND PORTUGUESE SENSORY EVALUATION APPLIED ON WOOL LIGHT FABRICS

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Abstract
In the frame of bilateral collaboration, the same samples made of wool and dedicated to men suits (light fabrics) have been tested through sensory evaluation panel that has been developed in France (Mulhouse) and Portugal (Guimarães).
In this paper, the obtained results have been analyzed, discussed, simulated and differences obtained have been statistically analyzed.
It is appeared that for some samples the two panels have highlighted the same marking or the same trends and for others the evaluations have been really different.
An analysis, attribute per attribute, have been carried out and it has been shown that some attributes have not been evaluated in the same manner depending on the nationality of the panelists.

INTRODUCTION

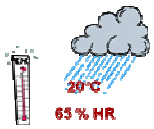
Sensory analysis is a methodology that uses human sensors to characterize measure, analyze and interpret the reactions of and the way they are understood.[1]
The sensory apparel does not depend only of the vision, touch, smell, taste and audition senses; it depends also of the memories, expectations and education. Is not only one sense that acts on the perception of a textile product, the senses are combined and are their connections that give the final result.
It is possible to apply sensory analysis, normally used in other industries like food, cosmetics or automobile, to the textile and clothing industry using the man and studying the influence of touch at the moment of clothing acquirement. In order to know the consumer's evaluation it is of main importance to act at the moment of product conception focusing on the most desired aspects of consumer's. [2, 3]
This methodology can be a great tool for the production and design sectors in the search for the development of new products, adapting them to the consumer's touch. It allows also to study the production processes and to change them taking into account the organoleptic properties of the product. This will improve the quality of the products and help the quality control during process production, allowing the increment of a long life product.
Sensorial or tactile comfort, identified only by "hand" touch, is essentially a result of how much stress is generated in the material and how it is distributed over the skin and, consequently, has a strong relationship with both mechanical and surface properties of the fabric. [4]
In this work, were defined and quantified the final attributes developed with a Portuguese and a French panel. Sensory analysis was performed by both panels using the same scale, the same evaluation conditions, and the same fabrics.
The analysis of textile attributes at Clothing Industry allows us to define and predict the more attractive and accepted final product that will satisfy the consumer's expectations.

MATERIALS AND METHODS

Experimental conditions

The sensory analysis by assessors under laboratory controlled condition leading to

qualification and quantification of touch of the fabrics.



The samples were evaluated in a standard atmosphere (65±2% relative humidity and 20±2ºC temperature), using a specific apparatus (*Figure 1*), in order to eliminate the visual factor.

Each session was limited to 30 minutes in order to avoid the decrease of sensitivity of the evaluators that could occur after a long period of evaluation [5]. So, it was being used the conditions:

- Control of humidity
- Control of temperature
- Light chamber
- One fabric at a time
- Disposable towel
- Soap with neutral pH
- Limited duration of each session: 30 min.

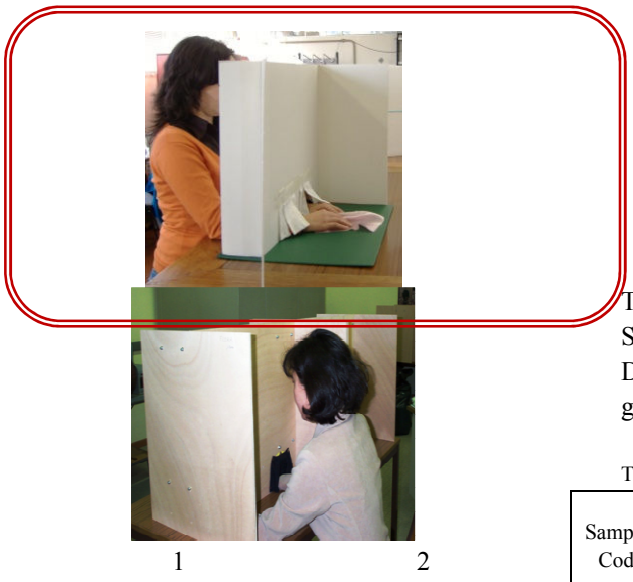


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FIGURE 1. Touch box: Portugal (1) France (2)

Assessor's creation

The evaluation panels (French and Portuguese) were composed by a group of free volunteers, called assessors that described the tactile perception of textiles using tactile common describers (attributes). The panel of sensorial evaluators is a heterogeneous group with different personal experiences, scholarship and different areas of knowledge, including, 11 adults (3 men's and 8 women's), in Portugal and 9 adults (4 men's and 5 women's), in France. The same methodology was used in both countries.

Textiles materials

The textile materials studied were 6 lightweight wool fabrics for making men summer suits and were selected and grouped second three approaches:

- Lightweight Wool Fabrics of very high quality, manufactured with super fine yarns of 2/80 Nm (40 m/g), using fibers of 18 µm of diameter (A).
- Fabrics of High Quality, manufactured with yarns counts of 2/64 Nm (30 m/g), made from fine fibers (20 µm of diameter) (B).
- The third model is considered a Standard Quality Article but with a springly touch, made with yarns of 2/52 Nm (26 m/g), manufactured with wool material considered economically standard, fiber diameter of 21 µm.
  To give to this article a "fresh touch" were used yarns with twist and retwist Z, contrarily to the other classis of materials that the yarns were manufactured by a traditional process of twist Z and retwist S (C).

The fabrics were finished in a traditional way: Shearing, Continuous Decatizing, Kier Decatizing and Steaming. At the Table 1, are given the fabric's specifications.

TABLE I. Fabric Specifications

Samples Code	Yarn Count (Nm)	Mass/ unit area (g/m^2)	Construction (spicks/cm) WarpxWeft	Thickness (mm)	Weave
A1	2/80	137	29 x 26	0.394	Plain
A3	2/80	153	33 x 28	0.471	Twill2
B1	2/64	152	27 x 23	0.429	Plain
B3	2/64	155	30 x 25	0.433	Twill2
C1	2/52	189	26 x 19	0.552	Plain
C3	2/52	208	27 x 23	0.612	Twill2

Scale used

All the elements of both panels participate on the creation of a standard scale that was used further. A structured scale were be used (*Figure 2*), that quantifies the intensity of each sensation (attribute) of (0-10). Zero

corresponds to no sensation and ten corresponds to extreme sensation. For a better comprehension of these values, reference samples, corresponding to each scale border, were supplied to the elements of the panel. A video, showing how the samples should be handled and touched for a correct evaluation, was also performed [6].

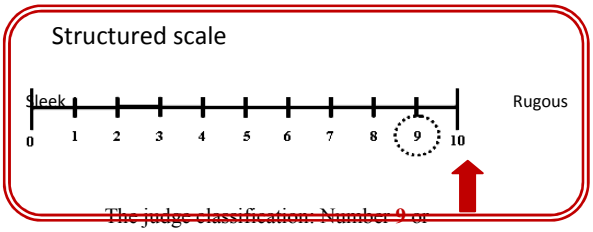

FIGURE 2. Structure scale

Attributes

Both panels (French and Portuguese) were trained using the same methodology. After their formation, the first step was the description of the sensations felted when different materials were touched, by the evaluators. Finally, using the describers mentioned by the evaluators, 15 attributes were selected. These attributes are shown in *Figure 3* [2, 7].

The panel training was based on the evaluation of the 15 attributes, using the predefined scale to quantify the sensation felted when each sample was touched. After several sessions, each element of the panel was able to evaluate the samples using the same value of the scale (with a variation of 1.5).

Six samples were evaluated, after training, and a panel comparison was performed.

The results presented in this study are related with the final attributes common to both panels. These attributes are presented in *Figure 4*.

From the 15 attributes defined in each country, 14 are common to both and were used for comparison.

Sleek-rugous, presented in the table on bold, was defined in Portugal. In France the panel gave a different terminology, grooved, however the sensation described for both terms are the same. The final attribute adopted was sleek-rugous based in the fact that these terms define bipolar sensation. For the same reason, the attribute rough-smooth, in bold, was adopted. In this case, a different term for the same sensation was adopted in France, soft, although with the same meaning. For these reasons both describers were included in the final list of common attributes for French and Portuguese panels.

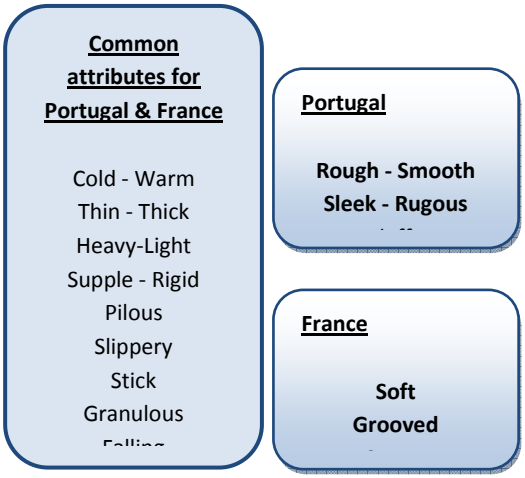

FIGURE 3. Final list of 15 attributes obtained by the French and Portuguese panels

FIGURE 4. Final list of 14 common attributes for French and Portuguese panels

The attributes that were excluded from this list was fluffy (Portugal) and greasy (France). These terms are not comparable because they are related with totally different sensations. *Figure 4* presents the final list of 14 common attributes for French and Portuguese panels.

Procedure

This study was performed in two steps (first the list of attributes of both panels was compared and further the panel evaluator's was trained). *Figure 5* resumes the procedure used for textile evaluation by the evaluator's panel.

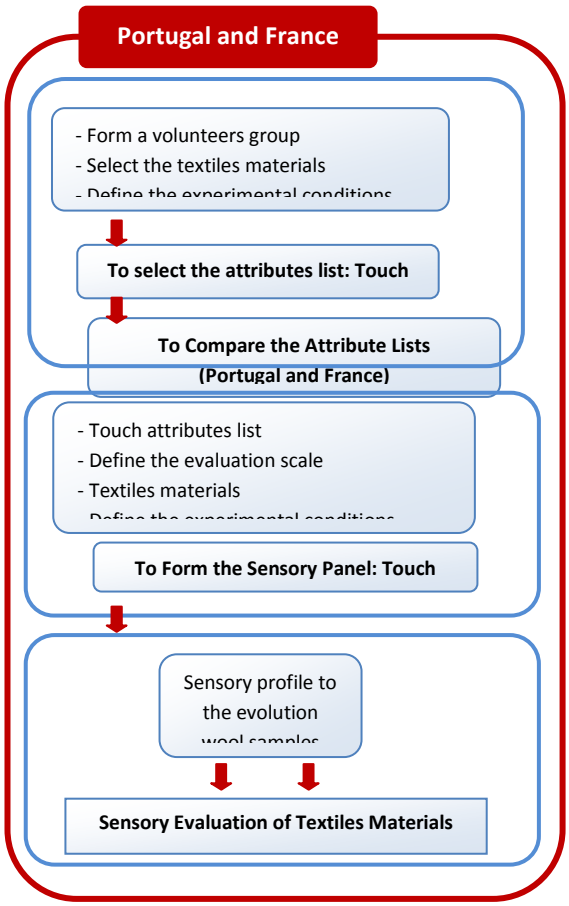

FIGURE 5. Sensory evaluation procedure of textile materials

RESULTS

The results show that the consumer's preferences, in terms of descriptors (attributes) are similar for both French, Portuguese panels. *Figure 6 and 7* shows the results of two panels, where blue represents the quantified sensations of the Portuguese panel and red the quantified sensations of the French panel.

Analysing the results obtained it can be depicted that for the 6 samples analyzed and for each attribute, the values obtained for both panels are similar. In some cases, for example shape recovery, the values for the two evaluations were exactly the same. Some values attained for attributes like falling, rough - smooth, granulous or pilous are not coincident but are always below standard deviation 2 and are similar.

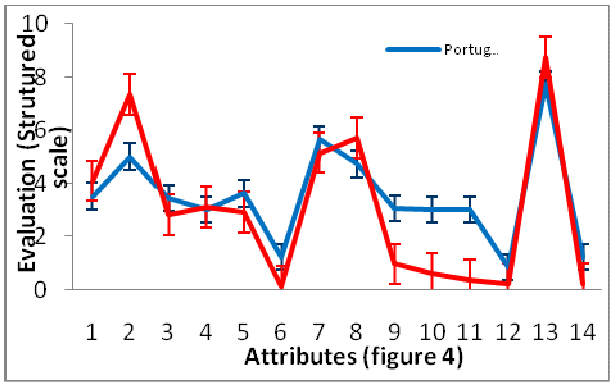

FIGURE 6. Comparison between Portuguese and French panel for each attribute on material A1

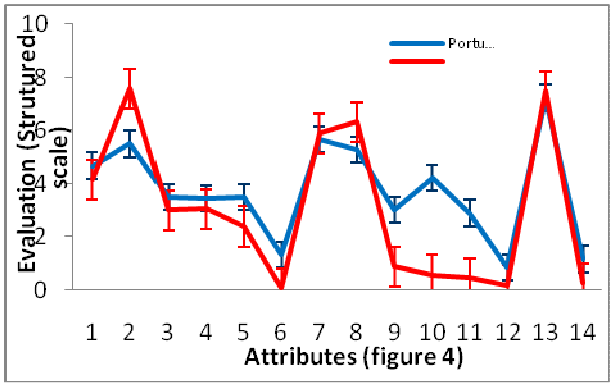

FIGURE 7. Comparison between Portuguese and French panel for each attribute on material A3

CONCLUSIONS

The results have shown a considerable effect of the pattern on tactile properties, especially the surface parameters. The results indicate that the consumer's preferences, in terms of descriptors (attributes) are similar for both panels (French and Portuguese). This is a significant step for the standardization of touch evaluation. The descriptors are the same for both panels and their quantification is also similar. For example, cold-warm is considered by both panels that quantify this sensation with the same value. Nevertheless, there are descriptors that fail this assumption. Granulous

and sleek-rugous are two descriptors difficult to evaluate by the judges for the majority of the samples. These descriptors are very similar and the panels are not able to differentiate them.

The most significant conclusion to take in account is that both panels have the same preferences, describing the touch using the same attributes and quantify them similarly. A huge step was made to obtain panels that represent the taste in terms of touch for both countries.

At the end of this study it can be concluded that the touch is still a subjective parameter hard to evaluate, however it is possible to compare both European consumers and reach a sensory profile well standardized. At the same time tactile sensory parameters can be included in product specifications.

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