

The experience of comfort is related to profession. Or is it linked to visual perception?

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Abstract The words "comfort" and "discomfort" are part of our daily life and are widely used by several cultures; their meanings and correlations are objects of continuous study in several scientific areas. We can have an experience of comfort or discomfort when using products or being in certain environments. Thus, the aim of this study was to attest whether the perception of comfort is influenced by one's profession, assuming that technical knowledge on the subject differs among professionals from different areas. Online questionnaires were sent and 242 Brazilian workers from different professions answered questions about their experience of comfort in various situations. The Kruskal Wallis statistical test was used to categorize the answers into groups by similarity of professional knowledge. The results suggest that the type of profession is not a significant variable as to influence people's perception of comfort. It was concluded that the variable "visual perception", although it was not the subject of this research, stood out in the results as being extremely significant, which confirms data in the literature pointing to the fact that the visual perception influences our experience and perception of comfort.

Keywords: General relativity, comfort, comfort model, products, expectations

1 Introduction

Comfort is present in our daily lives. Humans experience comfort in wearing clothes, lying in bed, using hand tools and kitchen appliances, dealing with computers and being in their workstations as well as in seats in cars, trains, buses and airplanes. Discomfort can also be experienced in our daily life and it has a relationship with the presence of musculoskeletal complaints [1]. Furthermore, both comfort and discomfort are often studied within the scientific domain. Vink and Hallbeck [2] found 104,794 papers mentioning discomfort in 30 years' time. Bazley [3] studied 318 scientific papers with the word "discomfort" in the title in a period of 10 years.

Comfort is an experience that involves a sense of subjectivity and well-being [4]. On the other hand, discomfort is related to physical factors [5] and can be associated with a sense of objectivity.

Several factors may influence the perception of comfort or discomfort, such as: how services are provided and received by the user [2], psychological (intellectual and emotional) factors [6], visual perception [3], temperature, noise, level of lighting, space of the environment, furniture and product design [7]. This complexity of factors that influence comfort and discomfort poses a great challenge when it comes to designing comfortable products and work environments.

Scientific articles on comfort usually correlate different variables. Some common examples are: the relationship between satisfaction and comfort [4]; comfort and emotion [8, 9]; comfort and product design [10]; comfort and ergonomics [10, 11, 12, 13]; comfort and safety [14]; comfort and productivity [15]; comfort and discomfort [2, 16, 17, 18]; comfort and health [19]; comfort and built environments [3]. However, research on the relationship between the user's perception of comfort and their profession is not common, perhaps because this brings another variable that is the expectation. According to Kamp et al., [20] the nature of expectations is subjective and of great importance for the experience of comfort. Theories about expectations are relatively underdeveloped.

Some comfort models, such as Vink and Hallbeck [2], indicate that expectation has a strong link with comfort. Taking this as a premise, the research question of this research was: Do professionals involved in the humanities or in the technological fields have different perception of comfort?

2 Methods

2.1 Participants

This study was conducted in Brazil and involved 242 participants, of whom 81 were men and 161 were women of different professions.

The age range of participants was from 17 to 66 years, with the largest number of participants (97) being concentrated in the age group between 30 and 40 (table 1).

Table 1. Age groups of participants.

<u>Age</u>	<u>Count</u>	<u>Percentage</u>
17-30	24	9,92
30-40	97	40,08
40-50	59	24,38
50-60	44	18,18
>60	18	7,44

N=242

2.2 Methods

Participants received the consent form along with the online questionnaire via GoogleDocs. The questionnaire contained 24 questions, 22 closed questions with answers within a comfort and discomfort scale ranging from 1 to 7. And 2 open-ended questions requiring the respondent to describe, with at least 03 words, the idea of comfort and discomfort. The goal of the questionnaire was to check participants' expectations and perception of comfort when viewing images of different products and whether this perception of comfort or discomfort would be more significant for professionals involved in the humanities or in technological areas. The evaluated products were: bed, hammock, airplane seat, train seat, office chair, foam pillow and feather pillow, different models of travel pillow, military boots, sneakers and situations like standing in a long line.

2.3 Statistical Analysis

This study used the Kruskal Wallis test in order to confirm the hypothesis of the research question. The Kruskal Wallis test is a nonparametric method for testing whether samples originate from the same distribution. This test is used to compare two or more independent size samples. When the Kruskal Wallis test is significant, it indicates that at least one sample randomly dominates another sample [21].

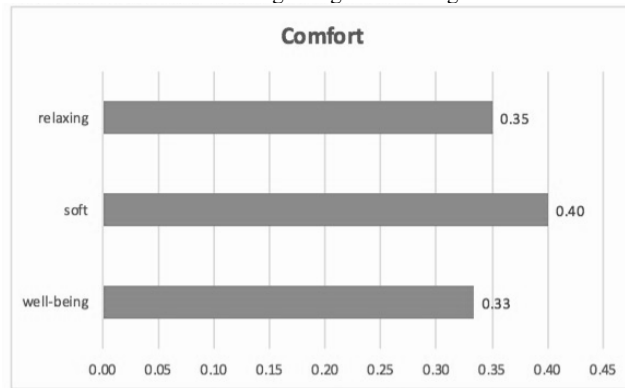
3 Results

The 242 answers to the questionnaire showed that, among the tested variables, a small difference was significant for the following variables: *age* and *gender* in relation to the *perception of product comfort*. Moreover, the variable *visual perception* produced very significant statistical results. No statistic difference was found regarding the correlation between variables *area of profession (humanities or technology)* and *perception of comfort*. This correlation was the object of the research question of this article. Thus, only the variables *age*, *comfort perception* versus *professional area* will be described in this research because they are relevant to what is proposed in this article.

3.1 Comfort

As a criterion of inclusion of the answers in the chart, we adopted the premise that the word to describe comfort or discomfort should appear at least 3 times in the answers. Thus, the words that appeared most in the answers regarding the idea of comfort were: relaxing, soft and well-being (chart 1).

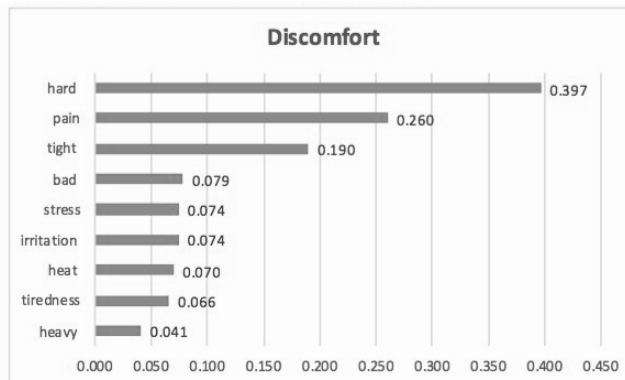
Chart 1. answers regarding the meaning of comfort.



3.2 Discomfort

Participants were also asked to provide words or expression that they associate with the idea of discomfort. The ideas provided by respondents to this question was: hard, pain, tight, bad, stress, irritation, heat, tiredness, heavy (chart 4).

Chart 2. answers regarding the meaning of discomfort.

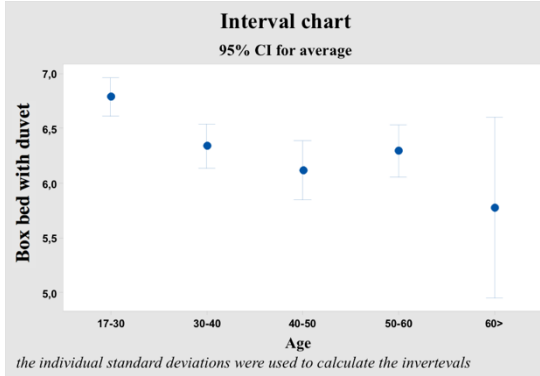


3.3 Age

3.3.1 Product | Bed

When requesting the participants to compare photos of two beds: a box bed with duvet (picture 1) and a single bed without a duvet (picture 2), the box bed with duvet ranked higher in comfort perception in the older age groups. Statistically, a significant difference was found for box bed with duvet (picture 1) in relation to age (Kruskall Wallis test, p value = 0.026). But in practice, the differences are small: <30 = 6.8, 30-50 = 6.3, > 50 = 6.2. (charts 3 and 4).

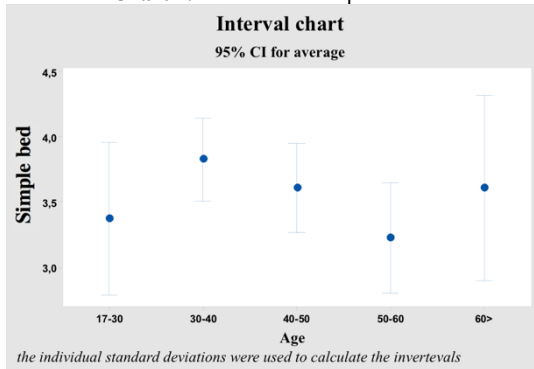
Chart 3. intervals for box bed with duvet



Picture 1. box bed with duvet



Chart 4. intervals for simple bed without duvet



Picture 2. simple bed without duvet



3.3.2 Product | Pillow

Regarding pillows, participants had to report their perception of comfort by choosing between a goose feather pillow (picture 3) and a latex pillow (picture 4). The difference was statistically significant for the goosefeather pillow with respect to age (Kruskall Wallis test, p value = 0.035). But in practice, the differences are small: <30 = 3.4, 30-50 = 3.6, >50 = 3.

Picture 3. goose feather pillow



Picture 4. latex pillow



3.4. Professional area versus Perception of Comfort

The professionals who participated in this research were categorized into two large groups. Group A comprising professionals whose knowledge is framed in the area of humanities and group B containing the professionals within the areas of technology. The Kruskal Wallis test was used to check if there was any correlation between the perception of comfort and the professional areas of humanities and technology (groups A and B). There was no statistically significant difference between groups A and B. Table 2 shows the statistical results of the comfort perception of professionals in groups A and B in relation to images of the different products contained in the questionnaire.

Table 2. Averages and p values (Kruskal Wallis test) for comfort vs professional area.

Variable	Profession	Average	StandDev	minimum	median	maximum	P value
Simple Bed	A	3,67	1,39	1,00	4,00	7,00	0.383
	B	3,56	1,48	1,00	3,00	7,00	
Box Bed+Duvet	A	6,32	1,09	1,00	7,00	7,00	0.361
	B	6,26	0,97	1,00	6,50	7,00	
Hammock	A	4,21	1,58	1,00	4,00	7,00	0.275
	B	4,47	1,54	1,00	5,00	7,00	
Large Aircraft Seat	A	5,19	1,48	1,00	5,00	7,00	0.386
	B	5,32	1,51	1,00	6,00	7,00	
Small Aircraft Seat	A	3,35	1,50	1,00	3,00	7,00	0.563
	B	3,24	1,57	1,00	3,00	7,00	
Spacious train seat	A	4,15	1,37	1,00	4,00	7,00	0.787
	B	4,17	1,60	1,00	4,00	7,00	
Tight train seat	A	2,91	1,38	1,00	3,00	7,00	0.515
	B	3,04	1,44	1,00	3,00	7,00	
Tight train seat 3 hours	A	2,46	1,49	1,00	2,00	7,00	0.592
	B	2,69	1,80	1,00	2,00	7,00	
Wood Backless seat	A	1,37	0,72	1,00	1,00	4,00	0.585
	B	1,57	1,21	1,00	1,00	7,00	
Foam Backrest seat	A	5,17	1,13	2,00	5,00	7,00	0.912
	B	5,17	1,14	1,00	5,00	7,00	
Line	A	1,96	1,39	1,00	1,00	7,00	0.226
	B	1,79	1,39	1,00	1,00	7,00	
Side pillow	A	3,58	1,54	1,00	4,00	7,00	0.219
	B	3,35	1,53	1,00	3,00	6,00	
Neck Pillow	A	4,34	1,48	1,00	4,00	7,00	0.796
	B	4,29	1,52	1,00	4,00	7,00	
Around neck pillow	A	2,86	1,64	1,00	3,00	7,00	0.104
	B	2,51	1,53	1,00	2,00	7,00	
Goose feather pillow	A	5,17	1,55	1,00	5,00	7,00	0.676
	B	4,99	1,80	1,00	5,00	7,00	
Latex pillow	A	4,57	1,74	1,00	5,00	7,00	0.472
	B	4,73	1,73	1,00	5,00	7,00	
Boots	A	2,57	1,32	1,00	2,00	6,00	0.754

	B	2,67	1,48	1,00	3,00	6,00	
Sneakers	A	6,16	0,91	2,00	6,00	7,00	0.736
	B	6,17	0,98	2,00	6,00	7,00	

3.5 Visual perception of the product versus expectation of comfort

Some statistically significant differences were found in the product comparison responses, as can be observed in table 3.

Table 3. Visual perception of the product versus expectation of comfort

Product 1	Product 2	Kruskall Wallis	Respective median
Simple bed without duvet	Box bed with duvet	p value = 0.00	4 against 7
Small aircraft seat	Large aircraft seat	p value = 0.00	3 against 5.5
Tight train seat	Spacious train seat	p value = 0.00	2 and 3 against 4
Wood Backless seat	Foam Backrest seat	p value = 0.00	1 against 5
Side pillow	Around neck pillow	p value = 0.00	3 and 4 against 2
Foam pillow	Goose feather pillow	p value = 0.08	4.5 against 5
Military boots	Sneakers	p value = 0.00	1 against 5

4 Discussion

The 242 participants in this study chose the following ideas to describe comfort: *relaxing, soft and well-being*. In regard to discomfort, the main words were *hard, pain* and *tight*. All terms associated with comfort and discomfort highlight concerns with physical issues. It should be remembered that people have a personal opinion about comfort [7] and that the experience of comfort or discomfort is different among people [3]. *Age* was a variable in this study which suggests that the more mature a person is, the more demanding she will be in regard to comfort issues. The results of this study also demonstrate that there is no relation between perception of comfort and *professional area*, as described in table 2. However, the variable *visual perception*, which implies a pre-experience of comfort, has a statistically significant correlation with comfort. These results are aligned with the literature on this subject [2,10] and specifically with the research by Bazley et al. [22], which reports that, in the user's pre-comfort experiences, the variable *visual perception* is the most significant one influencing the perception of comfort and it will, therefore, affect our experiences.

4.1 Limitation of the study

The sample of this study (n = 242) was limited to professionals in the areas of humanities and technology. Future studies involving professionals from other areas are suggested.

5 Conclusion

The research question of this research was: Do professionals involved in the humanities or in the technological fields have different perception of comfort? And the answer is no. This study showed that it does not matter if the professional is in the area of human or technology sciences and suggests that visual perception is the most contributory factor in the perception of comfort. The variable visual perception was not the object of this research; however, it was shown to be extremely significant in the perception of comfort, in agreement with other studies reporting that the first idea of a product is communicated visually [22]. Also the results of this study suggest that the age factor may be an important variable in the perception of comfort.

This study contributes to reinforce the importance of product design, which should always include the concepts of usability and comfort.

6 Acknowledgements

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7 Declaration of interest

The author states having no commercial relationship with the manufacturers of the products surveyed, as well as receiving any payment from these companies as compensation for the research.

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