COHERENCE, COMPLEXITY AND NOVELTY IN WRIST DEVICES FOR RUNNERS

Renan Cruz da Silva[1], M.Sc.
email: renan.cruz01@gmail.com
Lourival Costa Filho[2], D.Sc.
e-mail: lourival.costa@ufpe.br

[1] Universidade Federal de Pernambuco (PPGDesign), Recife, Pernambuco, Brazil
[2] Universidade Federal de Pernambuco (Curso de Design | PPGDesign | PPErgo), Caruaru e Recife, Pernambuco, Brazil

1. Context

Wrist devices have been present in people's daily lives since the end of the 19th century and the beginning of the 20th century. Initially configured for use by the military, over the years they started to be worn as a fashion item, a classification that lasts until today (Belcher, 2013; Friedman, 2015), with many wrist devices, such as the wrist watches, smartwatches and wristbands.

These devices can be found in the most varied styles. In the present study, sports-style wrist devices were selected as the object of empirical study. This choice is justified by the popularization of the fitness movement in Brazil.

Wrist devices are considered objects for individual use which, for Löbach (2001), is given to objects intended to be used by a single person. For this type of product, a visual configuration is required that promotes strong user-product identification.

The product's visual configuration also influences perceptual aspects - sensations such as pleasure and the wearer´s comfort, for example - as indicated by Post, Silva and Hekkert (2015). Despite this, studies focused on aesthetic aspects tend to be less common in Ergonomics, as indicated by Van der Linden (2007). Considering this strategic context, and in the endeavour of exploring this theme, this research is interested in examining the effects of Coherence, Complexity and Novelty on the Perceived Visual Quality of wrist devices for runners.

The theoretical focus of this research is Perceived Visual Quality, which, for Costa Filho (2012), is a psychological construction that involves subjective evaluations. Supported by Nasar (1988), the author also states that these evaluations primarily refer to aesthetic elements or to people's feelings about the product. While the former are considered perceptual / cognitive judgments, the latter are emotional judgments. Although Perceived Visual Quality depends, in part, on perceptual / cognitive factors, for Costa Filho (2012), following Nasar (1988), it is, by definition, an emotional judgment that involves evaluation and feelings.

The main research hypothesis was that Perceived Visual Quality assessments about the products under study are influenced by the aesthetic characteristics (Nasar, 1988) of Coherence, Complexity and Novelty of the wrist devices directed at street runners. Another hypothesis was that there would be no consensus on the results obtained on the preference of these characteristics of sports wrist devices between male and female runners.

The general objective of this research was "to evaluate the effects of Coherence, Complexity and Novelty of pulse devices on Perceived Visual Quality for runners". Taking the city of Recife as the spatial unit chosen for this empirical research and two different social groups as a sample taken for carrying out the study - male and female street runners - there are also more specific objectives: (1) test the adherence of the selected aesthetic characteristics to the type of evaluation intended; (2) check the integrated effects of these

characteristics on Perceived Visual Quality; (3) analyze the consensus of the results between the two different social groups focused on;

The undertaking of this research is justified by the possibility of generating relevant data both for the area of Ergonomics, in the sense of exploring an uncommon context for this discipline, as well as for the Design area, in view of the application of the data in product projects within the fitness segment.

For structuring the empirical investigation, the Facet Theory was adopted, seeking to balance the theoretical and empirical levels involved, in addition to perfecting the definition of methods, both for data collection and analysis.

2. Method

Facet Theory was taken as a reference for structuring the empirical investigation, being defined by Shye, Elizur and Hoffman (1994) as a comprehensive approach to the design of data collection and analysis in behavioral research, having been created and developed by Louis Guttman during the 1950s, in an attempt to make up for the lack of clarity in defining research problems, as well as the weakness of the statistical procedures used in the field of Social Sciences.

According to Bilsky (2003), there are three basic types of facets: the facet of the population of individuals considered in the research; the facet of the content of the researched variables, such as stimuli, items and questions. Together, the facets of population and content determine the field of interest, called the domain; the facet of rationale common to all facets, with a set of admissible responses from people, presented as an ordered scale of acceptance.

Bilsky (2003) states that all these facets are systematically associated with each other. These associations form a structuring sentence, a basic instrument of Facet Theory that verbally establishes the research variables, in addition to projecting the role that these variables have in the universe being investigated. For the purposes of outlining the research presented, a connective framework was developed in the form of a structuring sentence.

The developed research made use of a hypothetical-deductive approach and the selected procedure methods are exploratory.

The data collection method chosen for the research was the Multiple Classification System, defined by Canter, Brown and Groat (1985) as a simple request from the researcher to the participant to separate or group the same elements - illustrated by photographs - several times according to their own criteria. For the authors, this method stood out for its practicality and low demands on participants, in addition to familiarity with the process, since the act of dividing and choosing things is a common activity of individuals.

For the classifications, 18 photographs representing the selected wrist devices were used, based on the outline proposed by the structuring sentence for the evaluation of the Perceived Visual Quality of these products, all of which were the same size and with a standardized white background.

The responses recorded on the forms were transferred to a digital spreadsheet which was subsequently fed into the SSA of the HUDAP-7 program for data analysis. Based on Roazzi, Monteiro and Rullo (2009), Costa Filho (2014) conceptualizes SSA as a multidimensional scaling system designed for the analysis of the correlation matrix between variables represented graphically as points in a Euclidean space.

3. Results

By the end of the research, 32 responses had been obtained, among which 19 were male runners and 13 were female runners. All the participants live or work in the Metropolitan Region of Recife, are between 18 and

29 years old (34.4%), mostly male (59.4%), with a higher education (65.6%) and an income of up to 2 minimum wages (37.5%).

According to the information from the SSA, the Contrast facet took on a modular role in the diagram, in which the variables with high Contrast, present in the central region, have more influence on the Perceived Visual Quality of sports wrist devices.

The Complexity facet also plays a modular role in the diagram, with the central region formed by the maximum Complexity variables, exercising, in addition to the central and general role in relation to the evaluation carried out, a greater influence on the Perceived Visual Quality of sports wrist devices.

The Novelty facet plays an axial role over the original SSA diagram, revealing that an Innovative style is preferred by wearers of sports wrist devices, helping to build the Perceived Visual Quality of these products.

In the statistical analysis of SSA, the behaviour of the groups is interpreted according to the location of the external population variables in the Euclidean space. In this context, it was concluded that the researched groups diverge with respect to the influence of aesthetic characteristics on the sports wrist devices´ Perceived Visual Quality.

4. Conclusion

The structuring sentence for the evaluation of the research was corroborated, insofar as both the related categories (facets) and their internal elements were perfectly captured by the participants. Therefore, it is unnecessary to rewrite it.

Based on the corroboration of the proposed structuring sentence, and in response to the first specific objective of this research - to test the adherence of the aesthetic characteristics selected for the type of evaluation sought - it was found that all facets - Coherence, Complexity, Novelty - proved to be determinants for assessing the Perceived Visual Quality of sports wrist devices.

As for the second specific objective - to verify the integrated effects of the aesthetic characteristics in the Perceived Visual Quality of the sports wrist devices - it was concluded that the participants are more influenced by Low Contrast (High Coherence), Moderate Complexity and prefer the Typical style. The effects of these integrated characteristics therefore promote the Perceived Visual Quality of these objects.

For the third specific objective of the research - to analyze the consensus of the results between the two different social groups - it was found that there is a divergence in relation to the Perceived Visual Quality in sports wrist devices. Male street runners are more influenced by the aesthetic characteristics of Medium Contrast (Medium Coherence), Minimum Complexity, in addition to preferring a Typical style; whilst female runners were more influenced by High Contrast (Low Coherence), Moderate Complexity, as well as preferring an Innovative style.

It is considered, therefore, that the general objective of the research - to analyze the effects of Coherence, Complexity and Novelty on the Perceived Visual Quality of wrist devices for runners - was fully met and answered. It should be noted, however, that these results cannot be over-simplified, since they concern two groups of specific participants, from a specific place, at a specific period of time.

5. References

Belcher, D. (2013). *Wrist Watches: From Battlefield to Fashion Accessory*. 2013. [https://www.nytimes.com/2013/10/23/fashion/wrist-watches-from- battlefield-to-fashion-accessory.html].

Bilsky, W. A. (2003). Teoria das Facetas: noções básicas. *Estudos de Psicologia*, Campinas-SP, v.8, n.3, p. 357-365.

Canter, D.; Brown, J.; Groat, L. (1985). Multiple Sorting Procedure for study conceptual systems. In Canter, D.; Brown, J.; Brenner, M. (Eds.). *Research Interview: use and approaches*. London: John Wiley.

Costa Filho, L. L. (2012). *MIDIÁPOLIS: comunicação, persuasão e sedução da paisagem urbana midiática*. 2012. 271f. Tese (Doutorado). Universidade Federal de Pernambuco, Recife.

_____, (2014). O enfoque da Teoria das Facetas na avaliação de lugares. In C. Mont'Alvão & V. Villarouco, (Eds.). *Um novo olhar sobre o projeto, 2: a ergonomia no ambiente construído* (pp. 11-26). Recife: Editora UFPE.

Friedman, U. (2015). *A Brief History of the Wristwatch: The military origins of wearable tech, a century before the Apple Watch*. 2015. [https://www.theatlantic.com/international/archive/2015/05/history-wristwatch-apple-watch/391424].

Löbach, B. (2001). *Design Industrial: Bases para a Configuração dos Produtos Industriais*. São Paulo: Edgard Blucher.

Nasar, J. L. (1988). The effect of sign complexity and coherence on the perceived quality of retail scenes. In J. L. Nasar (Ed.), *Environmental Aesthetics: theory, research, & applications* (pp. 300-320). New York: Cambridge University Press.

Post, R.; Silva O.; Hekkert, P. (2015). The Beauty in Product – Service Systems. *IASDR 2015 Interplay*, 1717-1730.

Shye, S.; Elizur, D.; Hoffman, M. (1994). *Introduction to Facet Theory: content design and intrinsic data analysis in behavioral research*. London: Sage Publications.

Van Der Linden, J. (2007). *Ergonomia e Design: Prazer, conforto e risco no uso de produtos*. Porto Alegre: UniRitter.

Acknowledgments

The authors would like to thank CAPES, the funding agency which made this research possible, as well as all the empirical research volunteers making themselves available and for their participation.