

# The Subjective and Objective Nature of Website Aesthetic Impressions

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**Abstract.** This paper explores the possibility to predict positive aesthetic impression and user preference of website design through a combination of objective and subjective factors. The objective factors used are symmetry, order, balance, complexity while the subjective ones include familiarity - novelty ratings. The advantages of such an approach is the reduction of user involvement since the ratings of objective factors may be provided by a small number of design experts. We found indications that balance between certain factors maximize the possibility of users having a positive aesthetic impression.

**Keywords:** aesthetic evaluation, website preference, visual appeal

## 1 Introduction

One of the main goals of a website's homepage is to attract users and to elicit positive first impressions. First impressions are based mainly on usefulness of content, information structure, visual attractiveness and are influenced by user expectations, experience and training [1]. Research suggests that aesthetic factors are detected first and impressions based on them can influence subsequent website judgments [2]. However, the question on how to design for or how to measure positive aesthetic impressions seems to raise the ancient argument about whether beauty lays on the eye of the viewer or in the object itself.

According to Coates [3] balance between the opposing factors of "*Information*" and "*Concinnity*" creates a positive aesthetic impression. *Concinnity* relates to the order and sense while *information* relates to contrast and novelty perceived in design. Both constructs have objective (e.g. symmetry, contrast) as well as subjective (e.g. novelty) components. Perception of attractiveness is expected to reach a maximum, if a design is balanced in regard to these constructs. High *concinnity* results in boring and well structured designs and high *information* in very novel but confusing designs. Coates assumptions bear similarities to Berlyne's theory of experimental aesthetics [4] which suggest that there is an inverted-U shape relationship between *preference* and *psychological arousal*. Berlyne investigated the impact of a number of collative variables such as complexity, ambiguity and novelty on pleasure. In a more recent study Lavie and Tractinsky [5] identified two dimensions of website aesthetics: "*Classical*" and "*Expressive*". The "*Classical*" dimension of aesthetics relates to concepts such as symmetry, order and clear design while the "*Expressive*" dimension

relates to creativity and originality. There are similarities between the two dimensions and the notions of *information* and *concinnity*; however Lavie and Tractinsky do not see their dimensions as two ends of the same continuum. Additionally, they do not distinguish between objective and subjective components in their dimensions.

The goal of this study is to explore the usefulness of Coates “Information – Concinnity” theory for website aesthetic impression predictions. There are clear advantages for such an approach since predictions could be made with less user involvement. Objective components of *information* and *concinnity* such as *symmetry* and *contrast* can be investigated by design experts and user involvement could be reduced to familiarity - novelty judgments. Although *symmetry*, *contrast* and *complexity* have been labeled as objective factors, users could perceive them subjectively due to differences in background or training. Therefore agreement between experts and user’s as well as within users for these factors needs also to be investigated.

## 2. Methodology

In order to explore the usefulness of Coates theory an experiment was conducted in which the participants evaluated three alternative homepage designs of a university department’s website. Each design was prior assigned to one of the high *concinnity*, high *information* and balanced areas of the “Information – Concinnity” continuum (figure 1). In the initial phase of the study the three experimental designs were selected out of the six homepages which were identical in terms of text, images and logo but they differed in accordance to form, color, general layout and style. The homepages were designed with the intent to differ considerably in the “Information - Concinnity” scale. Given the complexity of the *information* and *concinnity* constructs we had the participants to evaluate their constituent components and then we calculated a score for each design. To that end forty four volunteer students (28 male, 16 female) of the university department in question evaluated the six homepages on *Symmetry*, *Order*, *Contrast*, *Balance*, *Complexity* and *Novelty* on a 9 point scale.



**Fig. 1.** University departments home page designs used in the experiment. Design A represents the *high concinnity* condition, B the *balance* condition, and C the *high information*.

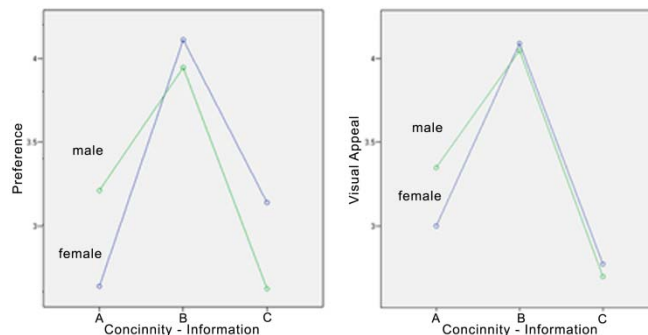
From these factors the “Information – Concinnity” construct was computed for each design. Equal weight has been assigned to subjective and objective factors. In

addition three design experts were asked to do the same in order to detect inconsistencies between them and website users without visual design training.

In the second phase another group of fifty three volunteer students (35 male, 18 female, age: mean = 22.2 SD = 0.92) from the same department evaluated the three selected designs. The evaluation took place on an eye-tracking device on which the three designs were presented randomly, first in pairs and then one by one. In the pair condition users had to choose which design they preferred most while eye-tracking data were simultaneously collected. Shortly afterwards, participants had to evaluate each design on *visual appeal*, *overall preference* and *novelty* on a 9 point scale.

### 3 Results

Factorial Repeated measures ANOVA for visual appeal and preference was performed with gender as a between subject factor. There was a significant main effect of “Information – Concinnity” on preference  $F(2,168) = 33.364, p < .001$  as well as for visual appeal  $F(2,168) = 29.650, p < .001$ . Preference and visual appeal judgment peaked in the B (balance between “Information – Concinnity”) condition as predicted by the theory.



**Fig. 2.** Preference (left) and Visual appeal (right) ratings for Designs A (high concinnity), B (balanced) and C (high information), for male and female ratings.

The A (*high concinnity*) design was perceived slightly better in visual appeal than C (*high information*) design. Although, there was agreement between gender in overall design preference we found an interaction effect between gender and “Information – Concinnity”  $F(2,166) = 5.033, p < .008$  for preference. In figure 2 we can see that male participants were more tolerant to the high concinnity design than female in both preference and appeal judgments. The eye-tracking data collected showed that design A had a smaller number of fixations and less observation time (mean 2.95 sec) in the pairwise comparison than the other designs. The design with the lengthiest observation duration was design B (mean 3.705 sec) followed by design C (mean 3.612 sec). Gaze time and fixation number can be indicators of attractiveness as well as for difficulty of the user to make sense of the stimuli. We used the eye-tracking data to confirm “objectively” that the designs were correctly assigned to each

experimental condition. Although, the eye-tracking data confirmed our assumptions for the *concinnity* and *information* condition it is difficult to differentiate between attractiveness and *information* as a cause for high values in the balanced condition.

In order to investigate inter-rater agreement in the objective factors ratings of the first phase we transformed them into rankings and Kendall's W was calculated. Kendall's coefficient of concordance takes values from zero (total disagreement) to one (total agreement). Results on all factors were significant, however agreement varied from moderate to high with *balance* achieving the lowest agreement (0.372,  $df = 5$ ,  $p < .001$ ) and *symmetry* the highest (0.723,  $df = 5$ ,  $p < .001$ ). It could be argued that low agreement levels indicates that some factors shouldn't be labeled "objective" since judgments about them were influenced by individual perceptions. However, agreement levels between average user ratings and expert evaluations were considerably high (Kendall's W from 0.886 -0.971). This means that safe results about the objective constructs can be achieved by a small number of design experts or a large number of users with no experience in design.

## 4 Conclusions

In the presented study Coates "*Information – Concinnity*" theory has been explored for its ability to predict user's positive aesthetics impressions of websites. The advantage of this theory is that it recognizes both subjective and objective components of its constructs. In our study we found evidence that balance between *information* and *concinnity* results in higher attractiveness and higher preference ratings. Results also suggest that preference criteria for females differ from males in that they appreciate creativity and novelty in web design more in contrast to males who are in favor of *order* and *symmetry*. It could be argued that males prefer websites that are perceived as usable since "*Concinnity*" as well as Lavie's dimension of *Classical* aesthetics have striking similarities to usability advocated design principles. However the design that successfully combines form and function, sense and novelty seems to be preferred overall by both genders.

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