

# Web Design for different User Generations: The Impact of Aesthetics on Emotions and Quality Perceptions

**Tina Hormann**

University of Twente

**Efthymios Constantinides**

University of Twente

**Carolina Herrando**

University of Twente

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## **Web Design for different User Generations: The Impact of Aesthetics on Emotions and Quality Perceptions**

*Abstract.* With widespread physical store lockdowns and consumers lastingly obliged to social distancing measures, electronic commerce seems more important than ever to apparel retailers. The purpose of this study in progress is to advance the state of knowledge regarding emotional and behavioral responses of generational cohorts towards website quality perceptions. A comprehensive model of the user experience from websites was developed based on theory on the classical and expressive aesthetics framework, core affect and generational cohorts for explaining how and when Generation X and Generation Z perceive a website as qualitative by means of its visual attractiveness. The core objective is to examine the relationships between aesthetics (classical and expressive), core affect (valence and arousal) and appraisal of website quality (attractiveness perception). A preliminary factorial experiment (n=88) by means of an online survey was conducted based on websites that were self-designed under the conditions of 2(classical, expressive) by 2(high, low) to evaluate the reliability and validity of the proposed relationships within the framework. Results validated the framework and provide insights into the affective mechanism how Generation X and Z react to web designs in an online apparel consumption context. Contrary to popular belief, it was empirically shown that online apparel shoppers from Generation X experience more positive valence and higher activating (arousal) levels being exposed to expressive web designs compared to consumers from Generation Z.

*Key-words: website aesthetics, core affect, generational cohorts*

*Track: Retailing & Omni-Channel Management*

## 1. Introduction

With widespread physical store lockdowns and consumers lastingly obliged to social distancing measures brought about by the COVID-19 (“Coronavirus”) outbreak, a severe recession may await the apparel industry (EURATEX, 2020). Electronic commerce (e-commerce) has been a lifeline for apparel retailers, and it is likely continue to be critical during and post-COVID-19 due to changes in online shopping behaviors across generational cohorts that are likely to have lasting effects (NORC, 2020). It therefore seems essential to advance understanding in the drivers of online decision-making across generational cohorts to leverage the pandemic’s economic impact.

Previous research has identified the visual appeal of websites as a main driver in website quality perceptions and online decision-making at large (Lindgaard et al., 2006). More recently it has been argued that website quality perceptions only present a subset of evaluative criteria, implicating that emotions induced from website aesthetics act as significant antecedents of consumer responses and future behaviors in online consumption (e.g., Kim & Lennon, 2013; Porat & Tractinsky, 2012). Little research however has emphasized the joint effects between aesthetics, emotions, and website quality perceptions, and little is known about potential differences across generational cohorts in this regard. To the best of our knowledge, except for the works from Djamasbi and colleagues on aesthetic web design preferences of Generation Y and the Baby Boomers (Djamasbi, Siegel, & Tullis, 2010; Djamasbi et al., 2011), no work so far has connected the study of aesthetics and related emotional and behavioral responses across Generation X and Z in an online consumption context.

In order to fill this niche, this study in progress claims about testing a more comprehensive model of the user experience from e-commerce websites based on the S-O-R paradigm of stimulus (i.e. aesthetics), organism (i.e. valence and arousal), and response (i.e. appraisal of website quality) within the frame of generational cohorts (i.e. Generation X and Z), to answer the following research question “*how do aesthetics in e-commerce web design affect emotional and behavioral responses across generational cohorts?*”. The objectives of this study are to: (1) assess the effect of aesthetics (i.e. classical, expressive) on affective responses (i.e. valence, arousal), (2) to examine the relationship between core affect and perceptions of website quality (evaluations on website attractiveness); and (3) to test the influence of consumer characteristics (i.e. Generation X, Generation Z) on the relationships between aesthetics, emotional responses, and behavioral responses.

## 2. Theoretical background

### *Components of user experience framework*

The components of user experience framework (CUE framework) brought forward by Thüring and Mahlke (2007) helps in establishing a conceptual framework to examine the underlying mechanism of how website aesthetics affect emotional and behavioral responses across generational cohorts. Its major premise is that any user experience with an interactive system consists of three central components: perception of instrumental qualities (e.g., usability), perception of non-instrumental qualities (e.g., aesthetics), and emotional user responses (e.g., subjective feelings and cognitive appraisals). Accordingly, both types of qualities may evoke emotions, and all three components together influence the outcome of the user experience, the user’s appraisal of the system dependent on the interaction context (Thüring & Mahlke, 2007). The framework is based on the S-O-R paradigm according to Mehrabian & Russell’s (1974) environmental psychology model, which postulates that environmental stimuli evoke human emotions (organism) that in turn result in more generally human responses under the concept of approach-avoidance tendencies (response). This approach has been applied in numerous marketing studies on online consumer behavior which have provided empirical support of the premise that the aesthetic design of websites can influence emotional and behavioral responses (e.g., Kim & Lennon, 2013; Porat & Tractinsky, 2012). In consequence, this study in progress understands the criticality of joint effects of the user experience in an online consumption context

and posits that website aesthetics, as a stimulus, has significant effect on consumer organismic responses and behavioral responses which are moderated by generational cohorts.

#### *Stimuli: Aesthetics*

Lavie and Tractinsky (2004) propose two high-order dimensions of aesthetics that are relevant in an online consumption context: classical aesthetics and expressive aesthetics. Accordingly, classical aesthetics denote to the order and harmony of the website interface, and are described through attributes as of cleanliness, clarity, symmetry and order. Expressive aesthetics, in contrast, denote to the web designer's personal creativity and originality, and the ability to break design conventions. Attributes such as creativity, specialty, novelty, sophistication, and being fascinating fall into the expressive aesthetics dimension (Lavie & Tractinsky, 2004). Numerous studies have provided empirical evidence in support of this two-dimensional perspective on aesthetics (e.g., Porat & Tractinsky, 2012), making the classical and expressive aesthetics framework an integral part in the study of consumer responses towards web design factors.

#### *Organism: Core affect*

In order to measure emotions from environmental stimuli, different scales have been developed from various viewpoints. According to the environmental psychology model, the organism is represented by three orthogonal dimensions of emotions that underlie human responses to environmental stimuli: pleasure, arousal, and dominance (PAD scale) (Mehrabian & Russell, 1974). However, affect theorists have instead suggested that emotions arise from cognitive interpretations of core physiological experiences (Cacioppo et al., 2000; Russell, 2003). In reinterpreting the circumplex model of affect (Russell, 2003), the author suggests that all affective states arise from two fundamental neurophysiological systems, one related to valence (a pleasure-displeasure continuum), and the other related to arousal (an activation-deactivation continuum), which together constitute the core affect. This perspective has been recommended for use to capture emotions in an online shopping context since dominance as an affective response to web design stimuli could not be established (Porat & Tractinsky, 2012). Therefore, the present study adopts Russell's (2003) two-dimensional measure of core affect.

#### *Response: Appraisal of website quality*

Website quality is widely deemed a determinant a significant antecedent of consumer responses and future behaviors, as well as an important indicator for e-commerce success (Kim & Lennon, 2013). According to Mahlke (2008), behavioral responses towards website stimuli can be more generally subsumed under the context of appraisal/dispraisal of website quality, since consumer responses relevant to e-commerce practice (e.g., purchase intention, consumer satisfaction) would not adequately reflect consumers' intrinsic evaluations of website quality. One of the measures of appraisal of website quality proposed by Mahlke (2008) is perception of website attractiveness which is adopted in this study.

#### *Consumer Characteristics (Generational Cohorts)*

The segmentation of online consumers into segments that have similar characteristics and behavior patterns, yet externally different from other segments, has been considered an efficient segmentation tool compared to age. Inglehart first proposed generational cohort theory to divide populations into smaller segments: generational cohorts (Inglehart, 1977; 1997). A generational cohort is conceptualized as a group of people born in the same time span, extending to the point where they have children of their own. Based on the passage of the same birth years, together with the shared macro-level events occurred during their coming-of-age years (age 17-24), generational cohorts develop similar attitudes, values, and beliefs. These may persist constant throughout their lifetimes, and create a generational identity (Inglehart, 1977; 1997).

There have been no single accepted ranges or labels for neither Generation X nor Generation Z (Lissitsa & Kol, 2016). Following a report on online apparel shoppers published by the European Commission in spring 2020 (European Commission, 2020), this study denotes Generation X for online apparel consumers in Europe born between 1965 and 1980, currently between 40 and 55 years old; and Generation Z for online apparel consumers in Europe born between 1996 and 2004, now around 16 and 24 years old.

### **3. Hypotheses development**

#### *Aesthetics and valence*

Researchers widely propose that classical aesthetics, which relate to how the web design elements are well organized in an orderly and clarified way, induce a more pleasant interaction with the site (Tractinsky & Lowengart, 2007). This premise is based not only on theoretical grounds in psychology that individuals intrinsically prefer objects that are easy to follow (Frijda, 1994; Maslow, 1958) reducing their cognitive efforts to process the design (Leder et al., 2004), but also on empirical evidence (e.g., Bhandari, Chang, & Neben, 2019; Porat & Tractinsky, 2012). Hence, a positive relation between classical aesthetics and valence is expected.

The role of expressive aesthetics on valence remains underexplored in the extant literature. As postulated by Tractinsky and Lowengart (2007), classical aesthetics induce more positive valence than expressive aesthetics, something that has been supported (Tuch et al., 2012). On the other hand, Porat and Tractinsky (2012) were able to empirically show an association between expressive aesthetics and feeling of pleasure. This finding is contingent with the new wave of user experience research which suggests that consumers these days expect websites emphasizing on the emotional experience (relative to expressive aesthetics), whilst taking functionality and usability (relative to classical aesthetics) simply for granted (Mahlke, 2008). Therefore, a positive relation between expressive aesthetics and valence is expected, too. Overall, it is expected that aesthetics is positively associated with valence.

(H1). *Aesthetics is positively associated with valence*

#### *Aesthetics and arousal*

The role of classical aesthetics on arousal remains seems less understood. According to Porat & Tractinsky (2012), high levels of classical aesthetics are associated with higher arousal levels. Yet, the authors did not further specify this finding, demonstrating the need for further empirical research. In general, arousal has been rather overlooked by researchers with the result that its potential impact on online decision-making has not been tested extensively (Bhandari et al., 2019). It was therefore considered fruitful to draw hypotheses based on literature on the visual complexity of web designs that is a closely related factor to classical aesthetics (Lavie & Tractinsky, 2004). It was reported that an increase in visual complexity is positively related with arousal as it becomes more complex for users to process the design, which then has carry-over effects to subsequent approach-avoidance tendencies (Tuch et al., 2012). Based on Berlyne's (1974) aesthetic theory, this would suggest an inverted U-shaped relationship between visual complexity and arousal. In consequence, a curvilinear (inverted U-shape) relationship between classical aesthetics and arousal is expected (H2).

The majority of studies are unified in the support of a positive relationship between expressive aesthetics and arousal (e.g., Porat & Tractinsky, 2012). The expressive aesthetics dimension is manifested by the ability to break design conventions and a strong determinant of excitement experienced (Lavie & Tractinsky, 2004). Studies have shown that websites that are designed on the premise of expressive aesthetics triggering the experience factor in online shopping have a positive relationship with arousal due to the online consumer's desire for fun and entertainment in online shopping (e.g., Kum & Lennon, 2013; Porat & Tractinsky, 2012).

Therefore, it is hypothesized that there is a positive relation between expressive aesthetics and arousal (H3).

(H2). *There is a non-linear relationship (an inverted U-shape) between classical aesthetics and arousal.*

(H3). *Expressive aesthetics is positively associated with arousal.*

#### *Aesthetics, core affect, and generational cohorts*

Ultimately, the question arised how Generation X and Z response emotionally towards aesthetics. Since this in an undeveloped field in research, we tentatively developed our hypotheses based on research on generational cohorts' online consumption behavior. Tractinsky & Lowengart (2007) suggest that classical and expressive aesthetics can affect valence and arousal across age groups in a different manner, implicating that younger consumers would probably be less enthusiastic about classical aesthetics based on personal attributes of openness and sensation-seeking. Similarly, research on generational cohorts indicates that Generation Z seeks fun and entertainment while online shopping and is less risk avoidant in contrast to Generation X who tends to prefer as much information as possible to secure themselves against potential frauds (Lissitsa & Kol, 2016). Considering the moderating role of generational cohorts in consumption settings (Parment, 2011) it was expected that generational cohorts moderate the relationship between aesthetics and valence.

Vice versa, Lowengart and Tractinsky (2007) postulated that older age groups are less enthusiastic about expressive aesthetics than the young, so that they are less open to experience something new. Thus, it is expected that Generation X is less open to web designs that are thought to break design conventions (i.e. expressive aesthetics) in contrast to more traditional and custom designs (i.e. classical aesthetics). This would lead to the assumption that levels of arousal differ across Generation X and Z exposed to expressive web designs due to their different needs and preferences in aesthetic designs (Frijda, 1994). Moreover, bearing in mind the natural process of vision loss with age (Leder et al., 2004), it is expected that older people may have difficulties in processing expressive designs while classical designs support their visual processing. Hence, it was expected that generational cohorts moderate the relationship between aesthetics and arousal. To summarize, it is hypothesized that there is a moderation effect for generational cohorts on the relationships between aesthetics and core affect.

(H4). *Generational cohorts moderate the relationship between aesthetics and core affect.*

#### *Aesthetics, core affect, and appraisal of website quality*

Finally, examining the potential relationships between aesthetics, core affect, and appraisal of website quality, the overall pattern of results suggests that valence has a consistently positive effect on consumer responses in the online environment (e.g., Porat & Tractinsky, 2012). Though the findings for arousal in this environment are less consistent and have varied across studies (e.g., Tuch et al., 2012), this may stem from the reason that preferences for aesthetics depend on individual motivations and believes of different personal values (Frijda, 1994). Second, these relations may be contingent upon the different levels of aesthetics in web design which may be achieved though self-designed interfaces with rather unconventional designs as opposed to the e-commerce websites consumers are familiar with and thus induce less arousal levels (Tuch et al., 2012). In fact, it is believed that consumers nowadays expect online shopping experiences to be fun and engaging (Lissitsa & Kol, 2016). Therefore, it was expected that generational cohorts appraise websites which they perceive as visually attractive according to their intrinsic preferences that moderate their consumption behavior as discussed extensively in the generational cohort literature (Parment, 2011). Thus, a positive direct relationship between core

affect and appraisal of website quality (H5) was expected, which is furthermore moderated by generational cohorts (H6).

(H5). *Core affect (valence and arousal) is positively related with appraisal of website quality.*

(H6). *Generational cohorts moderate the relationship between core affect and appraisal of website quality.*

#### 4. Methodology

##### *Research Design*

A preliminary 2(classical aesthetics, expressive aesthetics) by 2(high, low) experiment by means of an online survey was conducted in April 2020 to test reliability and validity of the proposed relationships. Based on Latin Square design (Winer, 1962), participants were randomly allocated to two out of four treatments of experimental design: either to treatments (1) and (4), which we called study (A), or treatments (2) and (3), denoted as study (B). The treatments consist of four website screenshots that were self-designed under the 2x2 condition. Subsequently, participants were asked to indicate their aesthetic perception of this stimuli in addition to their feelings of valence and arousal. To control for the moderating role of tasks and consumer goals in aesthetic evaluations (Frijda, 1994), participants neither performed any task in the experiment, nor did they have to achieve a specific goal. The survey concluded with an illustration of both website interface (stimuli 1 and 4 in study A; stimuli 2 and 3 in study B) next to each other which requested the participants' aesthetic preference based on the two design alternatives presented in each of the studies. Table 2 provides an overview of the treatments.

**Table 2.** Allocation of Treatments

Stimuli	Manipulation	Study	n (sample)	Gen X (n)	Gen Z (n)
1	high classical & high expressive	A	43	23	20
2	low classical & high expressive	B	45	24	21
3	high classical & low expressive	B	45	24	21
4	low classical & low expressive	A	43	23	20

##### *Experimental stimuli*

In study A, two self-designed screenshots were presented that illustrated landingpages of a fictive shoe vendor ("www.shoes-everywhere.com"). Study B consisted of two self-designed screenshots of a fictive clothing vendor named ("www.clothing-everywhere.com"). This was to control for potential brand familiarity effects (Frijda, 1974). Guided by Lavie and Tractinsky (2004), interfaces were manipulated based on the design parameters provided in Table 3 for classical aesthetics and in Table 4 for expressive aesthetics.

**Table 3.** Manipulation of Classical Aesthetics Design Parameters for Website Stimuli

Attribute	High	Low	Source
clear	high contrasts between web elements achieved through signal colors (red), large images and products framed in rectangles, unified color schemata	low contrasts between the different web elements, e.g. blurred or almost transparent light grey) product frames	self-developed based on Lavie & Tractinsky (2004)
clean	repeating colors, captions and product images in similar frames/sizes	no unitary color schemata, random size of product images	self-developed based on Lavie & Tractinsky (2004)
symmetry	grouped arrangement of web elements so that text and images are equally spaced throughout the interface	random arrangement of web elements so that text and images are	self-developed based on Lavie & Tractinsky (2004)

in one quadrant and the rest of the interface is almost empty

**Table 4.** Manipulation of Expressive Aesthetics Design Parameters for Website Stimuli

Attribute	High	Low	Source
originality	custom shapes rather than ‘regular’ e-commerce symbols and text, e.g. navigation illustrated through mannequins, usage of shades	Interface design is inspired from custom design guidelines, e.g. text-based navigation without shade effects etc.	self-developed based on Lavie & Tractinsky (2004)
creativity	display of products and e-commerce functions in an unusual and unexpected way (e.g., usage of custom shapes, non-linearity assignment of navigation symbols, 3-D product presentation)	display of products and e-commerce functions in a standardized way (e.g. navigation on the left corner, text-based navigation, etc.)	self-developed based on Lavie & Tractinsky (2004)
special	cascading style sheets (shadows) are used to create more ‘depth’ (e.g. shadows under navigation symbols), 3-D effects in product presentation	lack of cascading style sheets and regular methods of product and information presentation	self-developed based on Lavie & Tractinsky (2004)

### *Independent Variables*

A number of independent variables were included. *Classical aesthetics* and *expressive aesthetics* and *high* and *low* were treated as independent variables in the 2x2 experiment. In the survey, participants were first asked to indicate their immediate aesthetic perception to each of the two website stimuli. The items used for this aesthetic evaluation were derived from Lavie and Tractinsky’s (2004) 5-point-Likert scale on aesthetics. Emotional responses were measured through the independent variables *valence* and *arousal* using 7-point bipolar scales which label one category at either endpoint of the response scale were adopted from extant literature (Bradley & Lang, 1994). Though we acknowledge that the usage of different Likert-scales in the same questionnaire could be irritating to participants, we aimed to grasp intrinsic aesthetic evaluations without leaving participants too much thinking. Moreover, the different nature between the scales could help participants distinguishing without effort. Prior to the data analysis, scales were checked for normal distribution and standardized based on Z-scores for data comparability reasons. The independent variable *generational cohort* was captured and measured by two categories: *Generation X*, for participants born between 1965-1980, and *Generation Z*, those born between 1996-2004.

### *Dependent Variable*

There is one dependent variable relevant in this study that denotes the user’s appraisal of website quality: *perception of attractiveness*. Evaluations of participants’ *perception of attractiveness* towards the four website stimuli covered six items brought forward in the AttrakDiff scale by Hassenzahl (2001) that was examined on a 7-point bipolar scale (e.g. unattractive-neutral-attractive).

### *Sample*

The sample included a total of 168 participants that were recruited from the author’s private circles on a voluntary basis without any rewards. 28 percent of the respondents (n=47) could be grouped to Generation X, and 25 percent (n=41) to Generation Z. The remaining half (53 percent) of respondents could be grouped to other generational cohorts to be used in later studies. It is planned to collect data from additional samples. All participants gave consent on ethical approval following the General Data Protection Guidelines. The eligibility condition was that subjects needed to have bought apparel online at least once in the twelve month prior to the survey.



## 5. Summary of main results

Results as follow represent main findings from the first sample as of April 2020. Increase of sample size is planned. As manipulation check, we first investigated the changes in perceived aesthetics from the two interfaces presented in each of the two studies using repeated measures of variance (ANOVA). The findings in general showed that the interfaces were effectively manipulated ( $p < 0.5$ ). As a next step, we examined the structural model, and results showed significant main effects for classical aesthetics and core affect. Thus H1 and H2 were supported. Repeated measures ANOVA on arousal did not lead to significant results, thus H3 was rejected. Further analyses showed that there is a quadratic relationship between expressive aesthetics and arousal in form of an inverted U. The moderation effect of generational cohorts between aesthetics and core affect could not be established. Thus H4 was rejected. Hypothesis 5 on the relation between core affect and appraisal of website quality could be partially supported, with significant effect for valence but no effect for arousal. Finally, the moderation effect for generational cohorts on core affect and appraisal of website quality could not be established. H6 was rejected.

## 6. Discussion

The first goal of this study in progress was to assess the effect of aesthetics on core affect. Findings suggest that both classical and expressive aesthetics can impact core affect (H1). This supports the previous stream of user experience literature (Mahlke, 2008). Novel to extant research, quadratic relationships between both dimensions of aesthetics and arousal could be established (H2, H3). One explanation could be that self-designed stimuli were used compared to control for brand familiarity effects and to stimulate arousal more intensively (Tuch et al., 2012). The second objective of this study was to identify relationships between core affect and appraisal of website quality. In general, results indicate that both type of aesthetic qualities evoke appraisal of website quality. However, the proposed positive linearly relationship between core affect and appraisal of website quality (H5) could only be partially supported, with significant effect for valence but no effect for arousal which calls for further investigations. The third objective was to explore the impact of generational cohorts on the proposed relationships. Although it was expected that Generation X and Z would differ in their web design preferences, the overall pattern of results indicate that there are no significant differences (Hypotheses 4 and 6). Nevertheless, results indicate that Generation X is a moderator while Generation Z is not. An explanation could be that expressive aesthetics affect more the excitement spectrum in the user which may be prone to individual's experience with the Internet (Lavie & Tractinsky, 2004).

Reflecting these findings to the research question of this study, it can be concluded that both Generation X and Z appreciate e-commerce websites that are designed based on the premise of cleanliness, clarity and symmetry according to the classical aesthetics dimension. For both cohorts, those web designs could evoke the most pleasant feelings (i.e. highest ratings on valence) which resulted in the most positive evaluations of the website's attractiveness and appraisal of website quality. With regard to expressive aesthetics, the emotional and behavioral responses across Generation X and Z were less consistent. Nonetheless, though Generation X in total reported more pleasant feelings (i.e. higher levels of valence) from perceptions of expressive aesthetics, the difference in ratings compared to Generation Z was only marginal. Ultimately, though the effect of core affect on appraisal of website quality was significant, it was only hold for valence but not for arousal.

## 7. Contribution

Although online consumption behavior has been studied for years, the field of customer experience in a digital world remains an evolving area. This study in progress contributes to knowledge on web design factors that can affect generational cohorts' appraisal of website quality to facilitate the online shopping experience. Furthermore, it adds on the joint effects of

emotions in online consumption. By knowing what levels of classical and expressive aesthetics influence generational cohorts' website quality perceptions favorably, apparel companies can design and improve their e-commerce websites accordingly. Moreover, a more thorough understanding of the impact of valence and arousal as antecedents of appraisal towards e-commerce web designs could help adding insights on implicit processes in online decision-making.

## 8. Limitation and future research directions

This research clearly has several limitations. Our findings are limited to the several characteristics of the study design. Though the manipulation checks on the experimental conditions were statistically confirmed, we recognized that participants from study B (interface 2 vs. 3) have had difficulties in distinguishing website stimuli from another based on the two dimensions of aesthetics. Specifically, the results revealed that participants only reported marginally difference perceptions between the treatments of *high expressive aesthetics* (interface 2) vs. *low expressive aesthetics* (interface 3). One explanation could be that in study B, the interface stimuli were not manipulated based on the two extremes between the treatments of high/high vs. low/low as in study A, and were therefore probably harder to distinguish from another. Thus, although we tried to self-design the website stimuli in an exaggerated, 'non-typical' e-commerce way, further studies may benefit from self-designed manipulations of expressive aesthetics that are even more extreme.

Likewise, we acknowledge that the generality of the results is limited to the extent that participants could not browse the website, something that has been frequently criticized by HCI scholars (e.g., Tuch et al., 2012). Moreover, different to Thüring and Mahlke's (2007) CUE model that served as theoretical conception, this study disregards instrumental website quality perceptions (i.e. usability) as a distinct user experience component for the sake of simplicity (length of the thesis study). Following the seminal work from Tractinsky et al. (2000) on "*What is beautiful is usable*", additional research on the interplay between usability-emotions-aesthetics as postulated by Thüring and Mahlke (2007) could be vital in understanding online consumer behavior.

Another limitation that relates to the measurement is that our study has concentrated on website attractiveness as global measure in order to assess appraisal tendencies. Further studies could improve the predictor power of online consumer decision-making by using other criteria that are more closely relevant to the e-commerce context, such as purchase intention. In this view, the direct association between arousal and perceptions of attractiveness but its non-significant individual effect on appraisal of website quality calls for additional explanation. Lastly, emotions related to core affect were measured using subjective reports. Though they may give a hint to cognitive emotions, future research may clearly benefit from incorporating neuropsychophysiological measures to benefit from both subjective and objective measures.

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