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Is visual aesthetic sensitivity independent from intelligence, personality and creativity?

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ABSTRACT

Visual aesthetic sensitivity has been conceived as an intelligence-independent and personality-independent disposition (Frois & Eysenck, 1995). However, recent research suggests that aesthetic experience and its outcomes can be predicted by personality traits (Furnham & Chamorro-Premuzic, 2004; Furnham & Walker, 2001; McCrae, 2007; Rawlings, Barrantes-Vidal, & Furnham, 2000) and is cognitively facilitated (Leder, Belke, Oeberst, & Augustin, 2004; Reber, Schwarz, & Winkielman, 2004; Silvia, 2005, 2006; Smith & Smith, 2006). Following these new findings, three studies (the first ones in France) examined the Visual Aesthetic Sensitivity Test (Götz, Borisy, Lynn, & Eysenck, 1979; Götz, 1985) on young adult samples (Total $N = 345$). It was hypothesized that visual aesthetic sensitivity is related to general intelligence (study 1), specific personality traits (study 2) and figural creativity (study 3). The Visual Aesthetic Sensitivity Test was found to be predicted by intelligence ($r = .27$; $p < .01$) openness to aesthetics ($r = .27$; $p < .01$) and figural divergent thinking ($r = .40$; $p < .001$). Implications for further research are discussed.

1. Introduction

In the domain of scientific psychology, theoretical and empirical research on aesthetic judgment began in the 1930's with Birkhoff's aesthetic formula (Birkhoff, 1933), which defined the amount of received pleasure from an artistic stimulus as a ratio of amounts of order and complexity. Further work included Eysenck's general factor theory (1940) and Leder's multifactorial model (Leder et al., 2004) of aesthetic judgments. Considering both approaches, the aim of the present research is to show that Eysenck's general factor of aesthetic judgments, aesthetic sensitivity (Eysenck, 1940, 1941, 1983), has various sources of variation, notably intelligence, personality and creativity.

1.1. Conceptions of aesthetic judgment

Balance, the extent to which the elements of a pictorial configuration are organized "so that they appear anchored and stable" (Locher, 2003, p. 127), is an essential feature in the creation and judgment of visual displays (Frith & Nias, 1974; Locher & Nodine, 1989; Locher, 2003; Wilson & Chatterjee, 2005). Early scientific research on aesthetic preferences of visual objects (Eysenck, 1940) identified two principal factors that explained individual differences in aesthetic judgments. Whereas the first determinant of preference judgments refers to what Eysenck (1983) describes as "good taste" (the "T" factor), the second determinant refers to what we describe as preference for complexity (the "K" factor). The empirical bases of the "T" factor are data suggesting that people tended to agree on liking visual aesthetic objects (Eysenck, 1940), and that the judges who agreed the most with the average judgments were the same individuals among different types of stimuli, which provided evidence for a single factor in the field of aesthetic preferences (Eysenck, 1940, 1941). This dispositional "T" factor, aesthetic sensitivity, was identified as the ability to identify differences in terms of harmony and good design (Eysenck, Götz, Long, Nias, & Ross, 1984), and more generally, as "the extent to which, when a person judges the esthetic value of stimuli, his judgments correspond to the external standard of value which is being employed" (Child, 1964, p. 49). In Leder's multifactorial model (Leder et al., 2004), aesthetic sensitivity refers to the ability to perform a set of basic perceptual analyses of the stimulus, based on the stimulus' balance-related features, such as order and symmetry.

1.2. Individual differences in visual aesthetic sensitivity

Visual aesthetic sensitivity, as measured by the Visual Aesthetic Sensitivity Test (VAST; Eysenck, 1983; Götz, Borisy, Lynn, & Eysenck, 1979; Götz, 1985), is mainly described as an "isolated"

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innate ability (Frois & Eysenck, 1995; Iwawaki, Eysenck, & Götz, 1979), independent of intelligence (Frois & Eysenck, 1995; Götz et al., 1979), and personality (Frois & Eysenck, 1995; Götz et al., 1979). Furthermore, Frois and Eysenck (1995) found that artistically trained adults failed to have better scores than untrained 14–15 year-old children, suggesting that art training has no effect on visual aesthetic sensitivity. Overall, Frois and Eysenck (1995) have finally proposed that "genetic factors may be operating there", suggesting that individuals are predisposed to have high or low visual aesthetic sensitivity.

In contrast, recent theoretical and empirical framework supports extensively that aesthetic experience can be predicted by personality traits (Eysenck & Furnham, 1993; Feist & Brady, 2004; Furnham & Chamorro-Premuzic, 2004; McCrae, 2007; Rawlings, Barrantes-Vidal, & Furnham, 2000), and cognitive facilitation (Leder et al., 2004; Reber, Schwarz, & Winkielman, 2004; Silvia, 2005, 2006; Smith & Smith, 2006). Although such results have been supported by studies using various measures of visual aesthetic sensitivity, notably the Graves Design Judgment Test (Graves, 1948) and art interests, activities and knowledge questionnaires (Chamorro-Premuzic & Furnham, 2004; Furnham & Chamorro-Premuzic, 2004), they have never been supported by studies using the VAST before. Furthermore, these results have not been replicated in a French sample.

The present research, which is the first to study the VAST on an adult French sample, aimed to examine individual differences in aesthetic sensitivity. In line with recent framework (Chamorro-Premuzic & Furnham, 2004; Feist & Brady, 2004; Furnham & Chamorro-Premuzic, 2004; Leder et al., 2004; Reber et al., 2004), we hypothesize that aesthetic sensitivity is at least partly related to intelligence, personality and figural creativity. Indeed, (1) the relationship between visual aesthetic sensitivity and intelligence is widely suggested in previous research (Chamorro-Premuzic & Furnham, 2004; Frois & Eysenck, 1995; Furnham & Chamorro-Premuzic, 2004), and (2) while contradictory results using different measures have been found regarding the relationship between personality traits and visual aesthetic sensitivity (Chamorro-Premuzic & Furnham, 2004; Frois & Eysenck, 1995), the relationship between visual aesthetic sensitivity – as measured by the VAST – and personality traits, may have been partly underestimated in previous research by the use of wide-ranging personality inventories (Frois & Eysenck, 1995). Furthermore (3), the relationship between creativity measures and the VAST has not been investigated before, although its examination is suggested by previous significant research on the relationship between aesthetic judgment and personality (Aks & Sprott, 1996; Rawlings, Twomey, Burns, & Morris, 1998).

In study 1, we re-investigated the relationship between General Mental Ability and the VAST. In previous research (Frois & Eysenck, 1995), weak to moderate correlation coefficients (.20–.36 according to the different age samples) were found between the VAST and General Mental Ability as measured by Raven's Progressive Matrices (SPM; Raven, 1941) with participants aged between 10 and 15. Furthermore, recent empirical and theoretical research suggests that aesthetic judgment is related to cognitive facilitation (Chamorro-Premuzic & Furnham, 2004; Reber et al., 2004; Silvia, 2005, 2006; Smith & Smith, 2006), suggesting that the easiness with which one processes a stimulus can predict the outcomes of the aesthetic judgment of the stimulus. As intelligence may play a role in facilitating visual aesthetic sensitivity, we decided to further examine the relationship between intelligence and the VAST on an adult sample, hypothesizing a positive correlation.

In study 2, we hypothesized that general structural models of personality, though useful for exploratory research on relationships between a variable and personality, are not precise enough to investigate the relationship between the VAST and personality traits. As noted before, earlier work (Eysenck, 1972; Frois & Eysenck, 1995; Iwawaki et al., 1979) suggests that visual aesthetic sensitivity is not correlated to personality, as measured by the Eysenck Personality Questionnaire (EPQ; Eysenck & Eysenck, 1975). However, in these studies, possible relationships between visual aesthetic sensitivity and personality have only been investigated using the EPQ. In this study, based on recent research that suggested that art judgment ability is predicted by Openness to Experience (Chamorro-Premuzic & Furnham, 2004; Furnham & Chamorro-Premuzic, 2004), and on research on the art-related side of Openness (Eysenck & Furnham, 1993; Feist & Brady, 2004; Furnham & Chamorro-Premuzic, 2004; McCrae, 2007; Rawlings et al., 2000), it was hypothesized that visual aesthetic sensitivity is related to specific personality traits. More specifically, we propose in this study that high openness to aesthetics, high openness to fantasy, high openness to feelings, high openness to ideas are positively correlated with the VAST. Moreover, the VAST consists of recognizing harmonious and well-organized designs, it was hypothesized that the tendency to seek order and organization (Costa, McCrae, & Dye, 1991), is positively correlated with the VAST. In addition, because sensation-seeking is a predictor of aesthetic preferences (Rawlings et al., 2000, 1998), it was hypothesized to be a predictor of the VAST. Finally, because of the very definition of visual aesthetic sensitivity, it was especially hypothesized that, among these factors, openness to aesthetics is the best predictor of the VAST.

In study 3 we hypothesized that visual aesthetic sensitivity is positively correlated with creative potential, as measured by a figural divergent thinking task of the *Torrance Tests of Creative Thinking* (Torrance, 1966, 2008). Although research on the VAST (Frois & Eysenck, 1995) suggested that art training is not a predictor of visual aesthetic sensitivity, more recent research (Chamorro-Premuzic & Furnham, 2004; Reber et al., 2004; Silvia, 2005, 2006; Smith & Smith, 2006) suggests that aesthetic judgments partly depends on cognitive facilitation. However, such cognitive facilitation may not only result from high General Mental Ability, but also from high creative potential. As previous results (Aks & Sprott, 1996) suggest that creativity and aesthetic judgment are related, it was thus hypothesized that divergent thinking is a predictor of visual aesthetic sensitivity. More specifically, because creativity is partly domain-specific (Lubart & Guignard, 2004; Silvia, Kaufman, & Pretz, 2009), it was hypothesized that figural divergent thinking would be a better predictor of the VAST than verbal divergent thinking.

2. General method

2.1. Participants

All the studies were conducted on second-year French psychology students, who received credit course points for participation. The three studies were conducted separately on different samples.

2.2. Material

Unlike earlier attempts to measure aesthetic sensitivity, such as the Meier Art Tests (Meier, 1940) or the Graves Design Judgment Test (Graves, 1948), the Visual Aesthetic Sensitivity Test (VAST; Eysenck, 1983; Götz et al., 1979; Götz, 1985), has demonstrated adequate psychometric qualities (Frois & Eysenck, 1995). The VAST is composed of 50 pairs of abstract drawings, drawn by a German painter, Karl Otto Götz. In each pair, one of the two drawings was created to objectively show better aesthetic features than the other one, which is essentially the same drawing with "errors" that were added to make it less harmonious and balanced.

Participants have to indicate which of the two drawings is objectively more harmonious, which may not necessarily be the one they prefer. Content validity of the items was established by agreement between both experts' judgments and consensual judgment, suggesting actual objective differences in harmony within the material of the VAST (Frois & Eysenck, 1995). Although objective balance differences can also be achieved by computer processed images, Wilson and Chatterjee (2005) acknowledged that one of the key strengths of the VAST is its strong ecological validity, as the items resemble actual paintings.

The descriptive univariate statistical indices of all the measures used in this study are reported in Table 1. Overall, all samples pooled ($N = 345$), the psychometric qualities of the VAST were comparable to previous findings (Frois & Eysenck, 1995) and considered satisfactory. Indeed, the VAST discriminated well (the overall mean and standard deviation across all the studies were respectively 37.34 and 5.34) and showed relatively satisfactory internal consistency (Cronbach's alpha = .71) considering, as recommended by Kline (2000), the nature of the construct.

3. Study 1: visual aesthetic sensitivity and intelligence

3.1. Method

3.1.1. Participants

The participants of this study were 130 adults (119 females, 11 males) aged between 18 and 44 (mean = 20.96; SD = 4.46).

3.1.2. Material

The participants took the VAST and Raven's Progressive Matrices (SPM; Raven, 1941). The SPM are of the most used and most robust indicators of general intelligence (Carroll, 1993; Jensen, 1998). They are composed of designs with a part that is missing. The participants are expected to choose from a number of options the correct part to complete the design.

3.1.3. Procedure

The participants completed the VAST and the SPM. Tests were administered in random order. The overall duration for each participant was approximately 40 min.

3.2. Results

As hypothesized, a positive weak correlation ($r = .27$; $p < .01$) was observed between the SPM and the VAST, which is comparable to Frois & Eysenck's (1995) results. The positive correlation found in this study suggests that Visual Aesthetic Sensitivity is facilitated by high General Mental Ability.

Table 1
Descriptive statistics.

	Mean	SD	Minimum	Maximum
Study 1 ($N = 130$)				
VAST	38.59	3.86	29	46
Raven's matrices (SPM)	44.54	6.34	29	60
Study 2 ($N = 129$)				
VAST	38.93	4.82	22	49
NEO PI-R: sensation-seeking	21.46	9.81	2	35
NEO PI-R: order	22.05	7.27	7	35
NEO PI-R: openness to fantasy	28.10	7.02	11	40
NEO PI-R: openness to aesthetics	25.04	9.88	5	40
NEO PI-R: openness to feelings	27.23	9.72	8	40
NEO PI-R: openness to ideas	24.16	9.00	6	40
Study 3 ($N = 86$)				
VAST	39.55	3.98	30	49
TTCT verbal	13.86	6.52	3	30
TTCT figural	7.87	3.67	2	26

3.3. Discussion

The results of this study suggest that aesthetic sensitivity partly depends on cognitive facilitation. This result is consistent with the recent framework on aesthetic judgment (Chamorro-Premuzic & Furnham, 2004; Reber et al., 2004; Silvia, 2005, 2006; Smith & Smith, 2006). However, recent results on dispositional predictors of aesthetic judgment (Chamorro-Premuzic & Furnham, 2004; Furnham & Chamorro-Premuzic, 2004) also encourage the investigation of personality traits as predictors of aesthetic sensitivity.

4. Study 2: visual aesthetic sensitivity and personality

4.1. Method

4.1.1. Participants

The participants of this study were 129 adult participants (115 females, 14 males) aged from 18 to 49 years old (mean = 21.01; SD = 4.19).

4.1.2. Material

The participants took the VAST and subscales from the NEO-PI R. The NEO-PI R (Costa & McCrae, 1992; Rolland, Parker, & Stumpf, 1998) is a self-report questionnaire designed to measure the Big Five dimensions and their facets, which has shown satisfactory psychometric properties (Costa & McCrae, 1992; Rolland, 1993). As explained, because of their theoretical relevance (Furnham & Chamorro-Premuzic, 2004; McCrae, 2007), six out of the thirty 8-item subscales of the NEO-PI R were extracted and used in this study: openness to aesthetics, openness to fantasy, openness to feelings, openness to ideas, sensation-seeking tendency and tendency to seek order. The order of the 48 items was randomized.

4.1.3. Procedure

The participants completed the VAST and the personality measures in a randomized order. The overall duration for each participant was about 30 min.

4.2. Results

The descriptive univariate statistical indices of the measures that were used in this study are reported in Table 1. The VAST was found to be significantly predicted by openness to aesthetics ($r = .27$; $p < .01$), openness to fantasy ($r = .18$; $p < .05$), openness to feelings ($r = .25$; $p < .01$), openness to ideas ($r = .22$; $p < .05$), order ($r = .22$; $p < .05$) and sensation seeking ($r = .18$; $p < .05$).

Because all these personality measures were significant predictors ($p < .05$) of the VAST, we focused on exploring an optimal parsimonious set of personality predictors of the VAST. To do so, we used Generalized Linear Modeling (GLM), in order to compare the unique contribution of each predictor to individual differences. All possible combinations of level 1 predictors of the VAST went through a process of Generalized Linear Model (GLM) selection, using the glmulti R library (Calcagno & Mazancourt, 2010). The glmulti R library allows automatically computing, testing and ranking an exhaustive list of models from a list of predictors, using information criteria. The resulting optimal and parsimonious model may also be tested using classical inference, and this exhaustive screening methodology may be used in social sciences for both exploratory and confirmatory analyses (Myszkowski & Storme, 2012). Because this method does not depend on arbitrary decisions (such as the choice of a starting point and a stopping rule) and

converges to the best model, it is a better alternative to stepwise regression (Calcagno & Mazancourt, 2010; Myszkowski & Storme, 2012).

Using this procedure on our 6 predictors, all the 61 possible combinations of level 1 predictors were tested. The model ranking was based on the Minimal Akaike Information Criterion Estimate (MAICE; Akaike, 1978). The resulting optimal regression model of this procedure is a simple regression model that predicts the VAST score with only one personality trait: openness to aesthetics ($R = .27$; $F(1,127) = 9.868$; $p < .01$).

4.3. Discussion

Although previous research (Frois & Eysenck, 1995; Götz et al., 1979) showed that the VAST cannot be predicted by the broad personality factors measured by the Eysenck Personality Questionnaire, the results of this study suggest that the VAST is predicted with specific personality traits. More particularly, as hypothesized, the VAST is primarily predicted by an openness facet: openness to aesthetics. This result is consistent with more recent work (Chamorro-Premuzic & Furnham, 2004; Furnham & Chamorro-Premuzic, 2004), which showed that the Maitland Graves Design Judgment Test is correlated with Openness to Experience. It is also consistent with results that investigated the link between openness to experience and aesthetic experience (Feist & Brady, 2004; Furnham & Chamorro-Premuzic, 2004; McCrae, 2007; Rawlings et al., 2000).

5. Study 3: visual aesthetic sensitivity and creativity

5.1. Method

5.1.1. Participants

The participants were 86 adults (70 females, 16 males) aged from 18 to 44 years old (mean = 21.40; SD = 4.83).

5.1.2. Instruments

The VAST, a figural subtest and a verbal subtest of the Torrance Tests of Creative Thinking (TTCT; Torrance, 1966, 2008) were used. The descriptive univariate statistics of each of these measures are reported in Table 1. Because uniqueness and fluency scores are strongly correlated (Silvia, 2008; Torrance, 2008), and because uniqueness scoring is biased by sample size (Silvia, Martin, & Nusbaum, 2009), in this study we only used fluency as a measure of divergent thinking (see also Batey, Chamorro-Premuzic, & Furnham, 2009).

5.1.3. Procedure

The participants completed the VAST and the creativity measures in a randomized order. The overall duration of testing was approximately 40 min.

5.2. Results

The VAST was found to be moderately correlated with figural divergent thinking ($r = .40$; $p < .001$), and was not found to be significantly correlated to verbal divergent thinking ($r = .11$; $p = .32$). The difference between the two correlation coefficients was significant ($z = -2$; $p < .05$).

5.3. Discussion

The results reinforce the conclusion that visual aesthetic sensitivity is linked to high divergent thinking ability, especially high figural divergent thinking ability. Such a result is consistent with earlier framework suggesting that creativity and aesthetic judgment are related (Aks & Sprott, 1996).

6. General discussion

This study replicates previous findings on aesthetic sensitivity (Chamorro-Premuzic & Furnham, 2004; Furnham & Chamorro-Premuzic, 2004), extending it to a different measure of aesthetic sensitivity in a French sample. It is also the first empirical examination of the Visual Aesthetic Sensitivity Test in France. Aesthetic sensitivity was predicted by a variety of dispositional factors, including intelligence, figural creativity and personality traits (especially openness to aesthetics). As explained earlier, such a result about aesthetic sensitivity fits with recent frameworks on the outcomes of aesthetic experience (Chamorro-Premuzic & Furnham, 2004; Feist & Brady, 2004; Furnham & Chamorro-Premuzic, 2004; Furnham & Walker, 2001; Leder et al., 2004; McCrae, 2007; Rawlings et al., 2000; Reber et al., 2004; Silvia, 2005, 2006; Smith & Smith, 2006).

This study has limitations. In particular, as participants were recruited in a university of psychology, the sample is mostly composed with young women, which implies that the sample may not be representative of the general population. Moreover, the multiple studies do not allow the examination of a general predictive model of visual aesthetic sensitivity. Furthermore, in study 2, six subscales were extracted from the NEO-PI R, which may have jeopardized the validity of the measures: although the order of the items was randomized, the context of the full NEO-PI R is missing, and therefore, using the entire NEO-PI R may have lead to different results. Besides, study 3 uses only fluency as an indicator of creativity, which may be a comprehensive enough measure of creative potential. Finally, it was noted (Gear, 1986) that the VAST operationalizes aesthetic value only in terms of consensual harmony and balance and involves the recognition of this aesthetic value instead of personal taste for it. Thus, the VAST may not be regarded as a measure of visual "good taste".

This study brings elements to better understand the ability to detect the respect or violation of visual aesthetic standards. It allows a more precise identification and understanding of individuals with higher aesthetic sensitivity. In particular, this research suggests that visual aesthetic sensitivity has both cognitive and conative aspects, implying that high aesthetic sensitivity, however partly a cognitive ability (Frois & Eysenck, 1995), is fueled by motivation towards aesthetic concerns (Furnham & Chamorro-Premuzic, 2004). Moreover, this research indicates that general intelligence is a key component of judgment, even when what is being judged is art. It also indicates that the relationship between personality traits and aesthetic judgment can be underestimated by the use of major factors rather than a theory-driven selection of traits, which highlights the importance of using specific relevant facets in research.

Our results also indicate that visual aesthetic sensitivity is related to figural creativity, which suggests that the mastery of the aesthetic rules involved in aesthetic sensitivity measures (symmetry, balance, etc.) when judging aesthetic features may be helpful when producing graphical ideas. Such a result can have implications on the management and development of figural creative potential in fields which involve the application of aesthetic standards to elaborate aesthetic products (such as design, painting, advertising or architecture).

Further studies might focus on other dispositional factors, such as values and interests, using, for example, the Allport-Vernon-Lindzey Study Of Values aesthetic value scale (Allport, Vernon, & Lindzey, 1960), which was previously found to predict emotional responsiveness to art (Carlson & Parker, 1969). Moreover, because

art students have different emotional dispositions (Botella, Zenasni, & Lubart, 2011) and could be facilitated by expertise when judging art, differences between their VAST scores and other samples (such as artists, art students or designers) could be examined. Finally, emotion-related traits, which have earlier been found to impact creative performances (Zenasni & Lubart, 2008), could also impact performances in visual aesthetic sensitivity.

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