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Stronger shared taste for natural aesthetic domains than for artifacts of human culture

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ABSTRACT

Individuals can be aesthetically engaged by a diverse array of visual experiences (paintings, mountain vistas, etc.), yet the processes that support this fundamental mode of interaction with the world are poorly understood. We tested whether there are systematic differences in the degree of shared taste across visual aesthetic domains. In Experiment 1, preferences were measured for five different visual aesthetic domains using a between-subjects design. The degree of agreement amongst participants differed by domain, with preferences for images of faces and landscapes containing a high proportion of shared taste, while preferences for images of exterior architecture, interior architecture and artworks reflected strong individual differences. Experiment 2 used a more powerful within-subjects design to compare the two most well matched domains—natural landscapes and exterior architecture. Agreement across individuals was significantly higher for natural landscapes than exterior architecture, with no differences in reliability. These results show that the degree of shared versus individual aesthetic preference differs systematically across visual domains, even for photographic images of real-world content. The findings suggest that the distinction between naturally occurring domains (e.g. faces and landscape) versus artifacts of human culture (e.g. architecture and artwork) is a general organizational principle governing the presence of shared aesthetic taste. We suggest that the behavioral relevance of naturally occurring domains results in information processing, and hence aesthetic experience, that is highly conserved across individuals; artifacts of human culture, which lack uniform behavioral relevance for most individuals, require the use of more individual aesthetic sensibilities that reflect varying experiences and different sources of information.

1. Introduction

Humans evaluate their environments aesthetically, and these evaluations affect many aspects of life, from choice of free time activities and intimate partners to organization of living and work space. Aesthetic considerations affect mood and well-being (Koelsch & Jäncke, 2015; McCraty, Barrios-Choplin, Atkinson, & Tomasino, 1998; Moore, 1981; Rudd, Vohs, & Aaker, 2012; Zhang, Howell, & Iyer, 2014) and have been shown to influence productivity in the work place (Kaplan & Kaplan, 1995; Largo-Wight, Chen, Dodd, & Weiler, 2011; Leather, Pyrgas, Beale, & Lawrence, 1998; Nasar, 1994; Raanaas, Evensen, Rich, Sjøstrøm, & Patil, 2011) and healing times in hospitals (Ulrich et al., 2008; Ulrich, 1984). Aesthetic evaluations also clearly play a role in creative output.

Aesthetic evaluations occur in a variety of domains, from visual art, music, poetry, dance, or film, to judgments of faces and places. Each of these domains, however, has unique characteristics that may shape the evaluations of individual viewers, readers, or listeners. Even within solely visual aesthetic domains, the features that are critical for representing specific exemplars and distinguishing them from others differ from one domain to another. For example, there is evidence to suggest that recognition of facial identity relies on a detailed configural representation of metric distances between parts of a face (Biederman & Kalocsai, 1997; Farah, Wilson, Drain, & Tanaka, 1998; but see Burton, Schweinberger, Jenkins, & Kaufmann, 2015), and a large proportion of the variance in facial attractiveness can be captured by a metric "face space" model constructed on the basis of such metric distances and surface reflectance (Said & Todorov, 2011). Recognition of natural landscapes, however, may be mediated by global descriptors of scene structure and function extracted from local distributions of 2nd order image properties (spatial envelope; Greene & Oliva, 2009; McCotter, Gosselin, Sowden, & Schyns, 2005; Oliva & Torralba, 2001; Torralba &

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Oliva, 2003) and the distribution of colors (Oliva & Schyns, 2000; Vailaya, Jain, & Zhang, 1998). While photographs of landscapes and exterior architecture both contain information about spatial layout, the visual features that drive recognition of architectural elements such as degree of decoration, clarity of design and adherence to conventional norms (Oostendorp & Berlyne, 1978) are likely quite different from those that support an understanding of landscape, though both may require a representation of the shape of visual space (Franz, von der Heyde, & Bülthoff, 2005; Meyers-Levy & Zhu, 2007; Oliva, Park, & Konkle, 2011). Paintings may contain a set of stylistic features that enable viewers to identify an artwork by period or movement (e.g., Cubist), medium (oil or pastel), or even painter (Chuck Close portraits look very different from those by Vincent Van Gogh). Presumably, for each of these visual aesthetic domains, aesthetic valuation of specific exemplars requires attention to and weighting of features unique to that domain.

One open question in empirical aesthetics is the degree to which aesthetic preferences reflect universal processes that are shared in common across individuals, or alternately, reflect highly individual processes. For example, judgments of facial attractiveness tend to produce very high levels of agreement across individuals (Langlois et al., 2000), and variance decomposition measures find that facial attractiveness ratings can be explained by approximately equal proportions of "shared" and "private" taste (Germine et al., 2015; Hönekopp, 2006; Leder, Goller, Rigotti, & Forster, 2016). Aesthetic ratings of real-world scenes also show a strong shared component (Herzog, Herbert, Kaplan, & Crooks, 2000; Kaplan & Kaplan, 1995), which has led to a variety of theoretical efforts to explain aesthetic preferences as a deterministic result of objective stimulus features. For faces, averageness, symmetry and the presence of secondary sexual characteristics have been proposed as determinants of attractiveness (Gangestad, Thornhill, & Yeo, 1994; Rhodes, Sumich, & Byatt, 1999; Thornhill & Gangestad, 1999), while for scenes, evidence suggests that naturalness, expansiveness, fractal-like complexity, contrast, contour shape and spectral composition correlate with average preferences (Aks & Sprott, 1996; Amirshahi, Koch, Denzler, & Redies, 2012; Bar & Neta, 2006; Graham & Field, 2007; Graham, Schwarz, Chatterjee, & Leder, 2016; Menzel, Hayn-Leichsenring, Langner, Wiese, & Redies, 2015; Reber, Schwarz, & Winkielman, 2004; Tinio & Leder, 2009; Van Tonder, Lyons, & Ejima, 2002).

However, the existence of shared taste does not, in fact, mean that objective stimulus features determine preferences. For example, facial attractiveness judgments are modulated by degree of shared experience (Bronstad & Russell, 2007) and scene preferences are modulated by factors such as educational background, country of origin and ethnicity (Buijs, Elands, & Langers, 2009; Herzog et al., 2000). And while there is a degree of shared taste for real-world scenes that depict recognizable content, such shared taste does not reflect a reliance on "objective" stimulus features such as variation in color or shape—abstract images that also contain variation in these features (e.g. fractals, kaleidoscopic images) produce significantly lower levels of shared taste (Vessel & Rubin, 2010). Indeed, aesthetic ratings for visual art are highly idiosyncratic (Vessel, Starr, & Rubin, 2012), and there is evidence that such idiosyncrasies are also modulated by the degree of representational content: representational art produces greater agreement across people than abstract art (Schepman, Rodway, Pullen, & Kirkham, 2015), and the semantic associations that individuals generate in response to artworks are also more convergent for representational as opposed to abstract artworks (Schepman, Rodway, & Pullen, 2015). Previous work in urban design has also highlighted individual differences in architecture preferences (Nasar, 1994). Thus, the picture that emerges is that shared taste is not a result of a direct mapping between objective stimulus features and aesthetic preferences, but instead is the result of more similar subjective evaluations of a stimulus set across a sample of observers.

While there is evidence that shared taste may vary widely from one aesthetic domain to another, there has yet to emerge a clear understanding of whether such variation is systematic, and if so, what factors may lead to higher or lower degrees of shared versus private taste. Leder et al. (2016) directly compared faces and abstract artwork and again found that while about 40% of the variance in face preferences was accounted for by private taste, 75% of the variance in preferences for abstract artwork was accounted for by private taste. In addition, abstract art preferences were less affected by an instruction to rate according to the tastes of others, suggesting that individuals have no access to a valid concept of shared taste for abstract art.

Yet there are many differences between these two aesthetic domains that could account for this difference in private taste. One salient difference is that faces represent a "natural" category whereas artwork is an artifact of human culture. A second salient difference is that photographs of faces are depictions of real-world objects, while images of abstract artwork do not depict real objects. Even in the case of representational artwork, the viewer is aware that what is depicted is not a real object, but an artistically rendered interpretation. Existing data is unable to distinguish between these alternative explanations as a driver for observed differences in shared versus private taste.

Using images from five aesthetic domains—faces, natural landscapes, interior and exterior architecture, and visual art—we set out to test, systematically, variations in agreement across classes of visual objects ranging from the more fully natural to the more fully artifactual, while controlling for differences in medium and manner of depiction.

In Experiment 1, we computed preference agreement within separate groups of participants who each viewed only one stimulus domain. The participants performed two different tasks—a rating task designed to measure aesthetic appreciation and a "keypress" task designed to measure the amount of effort a person is willing to exert to view an image (e.g. incentive salience; modeled after Aharon et al., 2001). These tasks were chosen based on findings in rodents that the neurochemical system supporting consummatory pleasure ("liking") is separable from the system supporting incentive salience ("wanting"; Berridge, Robinson, & Aldridge, 2009). The rating task used in this experiment, however, asked observers to produce a single judgment of subjective aesthetic appreciation based on a range of potential aesthetic responses, and not just pleasure alone. We predicted that the more "natural" aesthetic domains (faces and natural landscapes) would show higher agreement than architecture or artwork, which are artifacts of human culture. We found highest agreement for faces, followed by natural landscapes, and then lower agreement for both interior and exterior architecture, and finally, lowest agreement for visual artworks.

Experiment 2 directly compared natural landscapes and exterior architecture, both photographs of real-world scenes with information about spatial layout, in a within-subjects design, and found significantly higher agreement for natural landscapes than exterior architecture on the rating task. The results support the hypothesis that aesthetic preferences for artifacts of human culture such as artwork and architecture are based on more individual sensibilities, whereas aesthetic preferences for naturally occurring aesthetic domains such as natural landscapes and faces have a stronger component of shared taste.

2. Experiment 1

In the first experiment, preferences were measured separately for individual classes of images: faces, natural scenes, interior and exterior architecture, and artwork.

2.1. Methods

2.1.1. Stimuli

Images and instructions were presented on a Viewsonic ViewPanel VE170 monitor using a Dell Precision T1500 computer running Windows 7 and Matlab R2011b with Psychophysics Toolbox-3 extensions (Brainard, 1997; Kleiner et al., 2007; Pelli, 1997). Subjects were