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Beauty and Beholders: Are Past Intuitions Correct?

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Abstract

This essay discusses four definitions of beauty from Western philosophy in light of recent experimental work from the more modern fields of psychology and biology. The first idea, derived from Plato, that beauty consists of relationships between parts, is partially confirmed by recent psychological experiments on infants and adults. The second idea, that beauty consists of one salient feature amid a mass of details, is more recent, perhaps from Hume, and is confirmed by some experiments on adults, but this finding has not been replicated in non-Western cultures. The third idea, that beauty is based on utility, occurs in Plato but is more difficult to support through experiments; biology suggests that a longing for beauty, not merely for survival, is an evolutionary target. Finally, the fourth idea, that beauty is a type of cognitive pleasure, is a constant thread from Plato through the work of Aquinas and Kant and seems to confirm a preference for an optimum level of complexity by adults, but cannot explain a parallel preference for complexity in human infants.

Part 1: Theories of Beauty

This essay discusses four definitions of beauty from Western philosophy in light of recent experimental work from the fields of psychology and biology. The experimental work in this essay relies heavily on both immediate and long-term reactions to visual stimuli, perhaps because of the historic emphasis on vision and on visual examples throughout Western philosophy.¹ The Platonic idea that beauty consists of relationships between parts finds partial confirmation in recent psychological experiments on infants and adults. The second more recent idea, perhaps to be attributed to Hume, that beauty consists of one salient feature amid a mass of details, is suggested by some experiments on adults, but may be culturally specific. The third idea, also found in Plato, that beauty is based on utility, is more difficult to support through experiments. Recent work in biology, especially in ornithology, suggests that the desire for beauty, not merely for survival, is an evolutionary

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target. Finally, the fourth idea, that beauty is a type of cognitive pleasure, recurs from Plato through Aquinas and Kant. The experimental finding that adults prefer an optimum level of complexity supports the idea that beauty is cognitive pleasure, but a finding that human infants also prefer complexity seems contradictory. In other words, early definitions of beauty can provide frameworks for experimental questions, but experimental results can also show where we might need to make our frameworks more comprehensive and inclusive.

The idea that beauty is a type of fit or appropriateness first appears in the early Platonic dialogue (c. 390 BCE) *Hippias Major*. The interlocutor Hippias says, “We shall agree to this, at any rate, that whatever is appropriate to any particular thing makes that thing beautiful” (290d). He does not mean individual fit, like shoes to feet or the beauty of gold added to a particular part of a statue.² But the statue is relevant because the relationship of different parts of the statue contains beauty. Socrates asks rhetorically, “‘Why, then,’ he will say, ‘did he [the sculptor Phidias] not make the middle parts of the eyes also of ivory, but of stone, procuring stone as similar as possible to the ivory? Or is beautiful stone also beautiful?’” (290c). In other words, Socrates’s questions imply that beauty is a good composition, or a good relationship of the parts to each other (Ludlam 1991, 147).³

Although the Neo-Platonic philosopher Plotinus (fl. 270 CE) picks up where Plato left off, he focuses on the relationship of the parts to one another as a beautiful, recognizable whole: “(The perceptive faculty) gathers into unity what still remains fragmentary, catches it up and carries it within, no longer a thing of parts, and presents it to the Ideal-Principle as something concordant and congenial, a natural friend” (*Enneads* 1.6). The cognitive nature of the “perceptive faculty” is something we will return to later, but the formation from parts of something close enough to ideal presumes that beauty is achieved only when the relationship of the parts is fit and appropriate.

Furthermore, the Christian philosopher and theologian Thomas Aquinas, writing in the 1200’s CE, includes discussions of beauty in his work the *Summa Theologica*. Although he is primarily Aristotelian in philosophical orientation, he occasionally quotes from Pseudo-Dionysius the Areopagite, an early (500’s CE) Christian theologian heavily influenced by the Neo-Platonism of Plotinus and others. Aquinas’s definition of beauty joins the physical, the mental, and the spiritual, resulting in the union of the spiritual and cognitive interior with the clear and well-proportioned exterior:

As may be gathered from the words of Pseudo-Dionysius the Areopagite (*On the Divine Name* 4), beauty or comeliness results from the concurrence of clarity and due proportion. For he states that God is said to be beautiful, as being “the cause of

the harmony and clarity of the universe.” Hence the beauty of the body consists in a man having his bodily limbs well proportioned in respect of the spiritual clarity of reason. (*Summa* Part 2.2, Q [145] Art. 2. Resp.)

While Aquinas acknowledges the beauty of human bodies, this beauty reflects a higher principle of proportion according to reason, and the beauty of the universe reflects the beauty of God, who causes it. Again, the relationship of parts to the whole is crucial for the definition and discussion.⁴

The phrase “spiritual clarity of reason” has much in common with a contemporary architect, Christopher Alexander, who says, “I am interested only in *real* beauty” (2001, 2). Drawing on his earlier semi-mathematical work (1978), Alexander (2001) proposes 15⁵ rules for good design, which is the same thing as beauty. Alexander even goes on to claim from his own experience that human beings agree on feelings with an overlap of about 90 percent, while the other 10 percent is particular to an individual (2001, 4). His work is about which patterns give life or not, and his rules in many ways apply the ideas of earlier philosophers.⁶

Four of his rules, not-separateness, local symmetry, deep interlock/ambiguity, and contrast, are related to the emphasis on relationship of parts outlined earlier. Not-separateness concerns the connectedness or unity of the whole in a hard-to-define way, but at the very least, no part seems to have dropped in from elsewhere. The rule of local symmetry is a more sophisticated version of balance or non-exact symmetry, where the features are symmetrical at each sub-center rather than around one central point, but usually the overall result is also more or less balanced. Deep interlock/ambiguity means that parts are juxtaposed and intertwined in such a way that it is often difficult to tell which part takes up more space or which part is the foreground as opposed to the background. This quality is, perhaps also thought of as an optimum level of complexity. Contrast depends entirely on obvious differences between parts, but again, the result is usually balanced.

Nevertheless, the second idea, that beauty is a salient feature, has few ancient antecedents. Hume is one of the first, if not the first, to describe recognition of beauties (his plural) as salient features above less than excellent details. He says about bizarre but appealing fiction writers: “the force of these beauties [in their work] has been able to overpower censure, and give the mind a satisfaction superior to the disgust arising from the blemishes.”⁷ We will refer later to the role of “the mind[’s] satisfaction” or cognitive pleasure, but the idea of beauty triumphing over blemishes, or of a signal being perceived against a background of noise, is quite persistent in modern thought.

Alexander (2001) describes such salient beauty as a “strong center” around which the other parts of anything are organized (84-85). He adduces as an example the bell tower or campanile in the Piazza San Marco in Venice: “all *focus* towards that one spot where the campanile stands: it is carefully *focused* to create this field effect” (Alexander 2001, 157, emphasis ours). Such “strong centers” could therefore also be described as “focal points” because they draw the eyes of viewers.⁸

The third idea that what is beautiful is useful, and vice versa, appears at one point in the *Hippias Major*: “Then, too, in the same way *we say* that the whole body is beautiful, part of it for running, part for wrestling ... the useful *we call* beautiful, and beautiful in the way in which it is useful, and for the purpose for which it is useful, and at the time when it is useful.” (*Hippias Major* 295c-d, emphasis ours). Still, Socrates uses the hedging phrases “we say” and “we call” to indicate that he does not uncritically endorse the idea.⁹

After this promising start, useful beauty devolves into usefulness for purpose and then into utility for political power, a particular interest of Hippias (295e). Socrates then floats the Socratic paradox, that no one does wrong knowingly, and uses it to disprove the beauty of power, since power can be used to do bad things, which are of course not beautiful (*Hippias Major* 296c). Socrates also goes to highlight the problem of whether things are useful for good because they are beautiful or beautiful because they are useful for good (296e-297c), but the difficulty is never resolved.¹⁰

In proposing the fourth idea that beauty is pleasure in hearing and sight, Socrates rejects other senses, like smell and taste, as lower, perhaps because they require getting close to the objects of pleasure, or because they are less able to convey abstract ideas like joy.¹¹ Socrates asks, “If something makes us rejoice, not all pleasures, but whatever is through hearing and sight, could we say it is beautiful?” (*Hippias Major* 297e) His examples are music, speeches, stories, painting, sculpture, and embroidery on clothing, which could be somewhat abstract like Greek key designs (*Hippias Major* 298a).¹² Socrates refutes this idea himself with the fallacy that only one sense can define the beautiful (299c); if one sense does, the other cannot (*Hippias Major* 300a-b). Hippias tries to resist this kind of exclusion by appealing to “the entireties of matters” rather than to hairsplitting over-analysis (*Hippias Major* 301b), but Hippias misses the idea of the relationship of parts.¹³

In another section of the *Summa*, where Aquinas is discussing the origin of love and desire, Aquinas distinguishes the beautiful from the good because the beautiful involves thinking or cognition rather than appetite: “Thus it is evident that beauty adds to goodness a relation to the cognitive faculty: so that ‘good’ means that which simply pleases the appetite; while the ‘beautiful’ is something pleasant to apprehend.” (*Summa* Part 2.1. Q [27]

Art.1.Rep.Obj.3).¹⁴ Here again are Plato's emphases on pleasure from both sight and hearing, but with the explicit involvement of cognition.

The idea of cognitive pleasure as defining beauty occurs not only in Hume in the passage cited above, but also in Kant (1790/1793) 2001. After distinguishing aesthetic art from pleasant arts like storytelling or games, Kant says, "aesthetic art, as beautiful art, is one that has the reflecting power of judgment and not mere sensation as its standard" (§44, 5:306). For Kant, beauty is cognitive but eschews determinate, provable concepts in favor of indeterminate but shared concepts.¹⁵ In other words, aesthetic pleasure in beauty is cognitive but not intellectual, *contra* Plato (Kant [1790/1793] 2001, §49-51, 5:313-5:325; McMahan, 2007a, 66-67).

Moreover, such "aesthetic art" shows form, while judgment supplies a corresponding concept, and the matching of form and concept through imagination is a type of cognitive pleasure (McMahan 2007a, 14, 123-125). The beauty of nature is also apprehended by cognition, which in turn allows us to understand nature and other people through a "pleasure ... released from the tethers that bind us to one perspective and to one place in time" (McMahan 2007a, 35). While Kantian aesthetics cast a very wide net around the purposes and social contexts of art and beauty, cognitive abilities recognize and define beauty. In all the permutations of cognitive pleasure previously discussed, the cognitive abilities of human adults are normative, but we will move outside these parameters in the next section.¹⁶

Part 2: Experiments of Beauty

Hermann Ebbinghaus, an early psychological scientist known for his pioneering work on the capacity of human memory, described psychology as having "a long past, but only a short history" (1908, 9). Indeed, it was the ancient epistemic questions of body and soul, the origins of knowledge, and the nature of learning originally proposed and debated by Plato, Socrates, and Aristotle that inspired and motivated the earliest psychological scientists. Ebbinghaus himself held a Ph.D. in philosophy from the University of Bonn. Science, as a way of knowing, employs reason to analyze patterns of empirical data (or that which can be observed by the senses) that has been gathered through systematically well-controlled experiments. Plato, while known for his distrust of relying purely on the senses to inform the truth (e.g. *Republic* 514a-521b), also insisted on rationalism to deduce answers, and had a great appreciation of measurement (e.g. *Meno* 82a-85b), both themes found throughout psychological exploration. Most consider Aristotle the "grandfather of modern psychology," based on his attempts at explaining many of the psychological concepts still investigated

today in his work *De anima* (“On the Mind”). Psychology, the field of science that explores the human behavior and the mind, has the challenging task of subjecting abstract human concepts such as intelligence, personality — and even beauty — to the rigors of the scientific method.

The philosopher Hume recommends deriving the “general rules of art” from “observation of the common sentiments of human nature” through “an experiment,” but it was not until the 20th century that anyone began to conduct such experiments in the “proper time and place” and after bringing “the fancy to a suitable situation and disposition” ([1757] 1965, 8).¹⁷ In order to explore beauty experimentally, two general approaches have been used. First, psychologists have used highly simplistic images that represent differences along a small set of visual features, like symmetry or complexity. Participants are then asked to report which they prefer, or find more beautiful, and then trends are revealed. A second approach involves analyzing artistic masterworks, appreciated as beautiful through the tests of time and culture, for the presence of certain features. In order to test for the relative salience of these features, participants are asked to show a preference for the original form or an altered form in which these features (such as symmetry or complexity) are removed or attenuated. A preference for the original would suggest that these features do indeed contribute to its hedonic value.

While the presence of balance and composition is one of the most consistent theories presented above, evidence in support of this theory from the field of psychology has been found to be rather inconsistent. Using geometric patterns as stimuli, both human adults (Jacobsen & Höfel 2002) and newborn infants (Fantz 1958) have been found to show a preference for symmetry. Adults also prefer patterns that have particular aspect ratios (McManus 1980; Jacobsen 2004), and infants prefer patterns with congruent spatial relationships (Turati 2004).¹⁸

However, using the second “top-down” approach to exploring human appreciation for beauty, other researchers have found that adults tend to prefer non-symmetrical abstract art in its original form over alterations that increase its symmetry (Krupinski and Locher 1988). Similarly, Krentz and Kincade (2012) found that adults show no increased preference for highly balanced original abstract art over subtly altered versions that had less symmetry. Nevertheless, when abstract art is highly altered to disrupt inherent balance, participants do seem to show a preference for the original art (Locher and Nagy 1996; Locher, 2003).

Further, McManus and Rogers (1985) found that there is a large variation in adults’ perception of balance in paintings. When asked to place a fulcrum under a series of paintings to represent two equal halves, there was little agreement where, and why, the

fulcrum should be placed. In perhaps the most convincing study to date on the relatively weak role of compositional balance in hedonic value, Vartanian and colleagues (2005) found that artistic masterworks were not judged to be more compositionally balanced than artworks of low artistic value (e.g. mass produced art).

This rather inconclusive evidence for an appreciation for balance, symmetry, or harmony in art may be explained by a robust preference found for stimuli and art that is highly complex and contrastive. Complexity is defined by the presences of many disparate elements — thus, by definition less symmetrical and balanced. Contrast is defined as a strong difference in adjacent values, also implying less harmony and consistency, which align themselves nicely with Alexander’s concepts of “deep interlock and ambiguity” and “contrast” as strong predictors of beauty in architecture. Daniel Berlyne, in the 1950s, began a series of experiments based on the first, “bottom-up,” approach to explore the basic rules of beauty in humans. By showing people simple line drawings that differed systematically and then asking which drawings they preferred, he observed that when given a choice, most people overwhelmingly preferred stimuli that were more irregular in shape, arrangement, typicality, and which had more elements. He termed this particularly salient group of visual elements “collative properties,” summarized as a drive for complexity and novelty. Others have confirmed this appreciation for complex images; for example, Bar and Neta (2006) found that adults prefer relatively more complex curved over more simplistically sharp objects and patterns, and Jacobsen and Höfel (2006) found a preference for complexity in patterns was almost as strong as a preference for symmetry.

Using real art as stimuli, Krentz (2012, in preparation) found that judged complexity of a set of 100 abstract artistic masterworks was a strong and significant predictor of judged hedonic value. Using a population of both adults and 6-10-month-old human infants, Krentz and Kincade (2012) further found that both young and old preferred the same highly complex and highly contrastive original art over more simplistic alterations, a preference suggesting that an interest in complexity and contrast begins very early in life, even before a significant impact of culture, experience in the world, and higher level cognitive reasoning. Interestingly, only the infants — not adults — in this study preferred the originally highly symmetrical artworks over alterations that reduced the symmetry, confirming past studies that have shown a strong preference for symmetrical patterns in young infants (Fantz 1958). Thus, Aquinas’s and Kant’s claims that beauty is something that can only derive from higher-order cognitive abilities may not be supported by developmental science, since infants have not yet developed the sophistication required for the “reflecting power of judgment and not mere sensation” (Kant [1790/1793] 2001, §44, 5:306). Indeed, it is quite possible that beauty begins as equivalent to Aquinas’s “good” and based simply on “appetite,” (*Summa* Part 2.1. Q [27] Art.1.Rep.Obj.3), or perhaps Plotinus’s concept of the

“natural friend” (*Enneads* 1.6), but then develops into a truer, more mature form of beauty that relies on more sophisticated cognitive abilities.

Furthermore, some research in biology suggests that appreciation of beauty may not be limited to higher order cognitive abilities in humans, but may even extend outside humanity. For example, the ornithologist Prum (1997) argues that female manakin birds prefer mates with certain plumage patterns and display behaviors that do not necessarily contribute to species survival since the traits vary among subpopulations in nearly identical habitats (669-670 & 684-687).¹⁹ Rothenberg (2011) extends Prum’s ideas to argue that appreciation of beauty or “delight,” rather than mere survival, is the evolutionary target for some features of animals like peacock tails or bird song, and perhaps human art works the same way (62-85).²⁰ Rothenberg recalls Plato’s definition of beauty as pleasure in hearing and sight or Kant’s cognitive but non-intellectual pleasure, but includes pleasure felt by female birds as well as by philosophers.

The above mentioned psychological and biological methods are designed to find general trends in the appreciation for beauty (akin to Alexander’s 90 percent agreement in designs that have “life”), and usually are focused on the role of objective visual features in driving this appreciation. In order to measure individual differences in definitions of beauty, another family of researchers have found that our level of art education (Lin and Thomas 2002; Winston and Cupchik 1992), our emotional state (Furnham and Walker 2001; Rawlings, Vidal and Furnham 2000; Reber, Schwarz and Winkielman 2004) our degree of familiarity (Zajonc 1968, 1998) and even our natural temperaments (Silvia, Henson and Templin 2009) shape what we find pleasing.

Certainly, the role of culture also plays a role in aesthetics (see Morphy 1993), confirming Alexander’s “10 percent” of variance in beautiful architecture that reflects cultural idiosyncrasies. Interestingly, recent research has found that attentional patterns for visual stimuli also seem to vary by culture. For example, Japanese participants are more likely to notice the contextual characteristics of visual scenes, whereas American participants notice salient foreground objects, or focal points (Kitayama, Duffy, Kawamura, and Larsen 2003; Masuda and Nisbett 2001; Miyamoto, Nisbett, and Masuda 2006). Further, Krentz and Kincade (2012) found that adults (all from an American college), but not infants (relatively naïve to cultural influence), preferred original art with intact focal points over versions where the focal point has been attenuated or removed. Thus, although Alexander lists a “strong center” as one of his universals, this factor may in fact reflect his own cultural bias, and be better suited for an example of the variable 10 percent.

While ancient theories and modern research about aesthetics focus heavily on the sense of vision, future research may test the aesthetics of smell, taste or touch with more sophisticated experimental designs and even equipment. Studies of animal evolution may provide further evidence of selection for preferences not related to survival, but based on features like secreted odors instead of plumage or songs. Although senses like smell are often regarded as less cognitive than vision, experiments with infants may provide further confirmation of the early appreciation of beauty in senses other than vision.²¹

In conclusion, while ancient philosophers set the stage with provocative ideas about the enduring parameters of beauty, much can be learned about the validity of these ideas from evidence collected from modern psychological and biological scientists. For example, experiments in psychological aesthetics only partially confirm the ancient philosophical idea that beauty consists of a harmonic relationships between parts. While humans, both young and old, prefer symmetry and balance in simplistic patterns, adults do not seem to agree on what makes an artistic painting seem balanced, and prefer complexity and contrast (or un-relation between parts) over strict regularity. Experiments in developmental psychology have also contributed to a modern perspective on the philosophical idea that beauty consists of one salient feature amid a mass of details. Indeed, this definition of beauty seems to apply primarily to the aesthetics of modern Western culture. The ancient idea that beauty is utility is challenged by biological evidence that at least some features of animals, like peacock tails or male manakin bird plumage, evolved to maximize beauty rather than utility. Finally, in response to the claim that higher order cognitive abilities are needed to find pleasure in beauty, experiments with infants suggest that there are certain visual primitives in art that even infants can appreciate, such as the presence of complexity and contrast. This suggests that an appreciation of beauty begins very early in human development, perhaps most like Plotinus' concept of the "natural friend" (*Enneads* 1.6), preceding the influence of culture, experience, and higher-level cognition.

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¹ For example, in her recent work extending Kantian aesthetics, McMahon 2007a uses primarily visual examples (e.g. 120), except for some musical examples (1, 75, 77, 143) and occasionally examples centered on the sense of taste (76-77, 195).

² Ludlam 1991, 147-149. Note that individual body parts of statues could be gilded, and sometimes were in the form of removable plates like the famous statue of Athena by Phidias in the Parthenon.

³ The emphasis on beauty as harmony, expressed in singing and dancing competitions, is made more explicit and more political in Plato's last work, the *Laws* 653a-665e (McMahon 2007b, 29, 31).

⁴ Forte 2008, 16-23. Hume (1757) 1965 also asserts, "In all the productions of genius, there is a mutual relation and correspondence of parts" (16). But one must be a genius not only to create such a work, but also to appreciate it.

⁵ Alexander 2001, 143-296. In contrast, Ramachandran 2011 has between eight and 10 rules for beauty.

⁶ Some of his rules, particularly the “local symmetry” rule, come from psychological experiments (Alexander 2001, 188-192 with 242 n.2).

⁷ Hume (1757) 1965, 7-8. His main example is the Renaissance poet Ludovico Ariosto, but his statement relies enough on visual metaphors (“blemishes”) to apply also to visual art. He later says, “A good palate is not tried by strong flavor, but by a mixture of small ingredients, where we are still sensible of each part, notwithstanding its minuteness and its confusion with the rest. In like manner, a quick and acute perception of beauty and deformity must be the perfection of our mental taste” (Hume [1757] 1965,12).

⁸ Even though Alexander adduces some non-Western examples like the Great Mosque of Kairouan in Tunisia (Alexander 2001, 151), we will see that this emphasis on salience may be determined by culture or even by artistic style. McMahon comments, “The style we attribute to a work determines what is salient in the work” (2007a, 155).

⁹ This idea has been revived several times, notably by Kant’s contemporary Edmund Burke (McMahon 2007a, 13) and by some evolutionary biologists (Rothenberg 2011, 3-6, 82-86), but is not borne out by evidence, as discussed in Part 2.

¹⁰ The relationship between ethical goodness and beauty is beyond the scope of this essay, partly because the literature is huge, from Plato’s *Republic* through the writings of Tolstoy (Davies 2006, 199) to the philosopher Elaine Scarry (2000), and partly because moral features are more difficult to identify than aesthetic features (and how do you assemble a control group of evil things or people?).

¹¹ Aquinas also lowers the status of the other senses, but based on everyday language: “But in reference to the other objects of the other senses [besides hearing and vision], we do not use the expression ‘beautiful,’ for we do not speak of beautiful tastes, and beautiful odors.” (*Summa* Part 2.1. Q [27] Art.1.Rep.Obj.3, Trans. English Dominican Fathers).

¹² Plato often returned to the issue of pleasure in his later works; for good kinds of pleasure, see Plato, *Republic* 585d, *Philebus* 31d, 42d, 52a, 54c, and especially the cognitive and intellectual pleasure of observing geometric shapes at *Philebus* 51b-d; we owe these references to Gabriel Lear. For bad kinds of pleasure catering to the appetites, see Plato, *Gorgias* 493e-495a.

¹³ *pace* Ludlam 1991, 132-136, although we accept his interpretations of other passages.

¹⁴ Aquinas does not here mean “good” in a moral sense, but in a peculiarly Classical sense of “satisfying,” like good food.

¹⁵ Kant (1790/1793) 2001, §9, 5:219, §56, 5:338-5:339; McMahon 2007a, 5 explains the distinction between determinate and indeterminate concepts. Davies 2006, 8 asserts that for Kant, “aesthetic experience is ... a cognitive but non-conceptual process.” For further discussion, see Guyer 2006, 311-331.

¹⁶ McMahon 2007a, 114-115 makes these parameters explicit, although she uses the example of children learning to write.

¹⁷ Nevertheless, Hume emphasizes the role of the aristocratic, highly educated, putatively impartial critic over this more democratic, ‘common-sense’ experiment ([1757] 1965, 10-21).

¹⁸ Taken together, these two perceptual preferences have been thought to partially explain the preference for faces that begins at birth (Kellman & Arterberry 2006; Nelson 2001). Interestingly, both adults and older infants judge facial attractiveness based on presence of symmetry (Cardenas & Harris 2006; Langlois, Roggman, & Rieser-Danner 1990) and “averageness” (Langlois & Roggman 1990; Rhodes & Tremewan 1996), a clear example of the presence of stable visual preferences for complex stimuli across the lifespan.

¹⁹ The negative formulation is deliberate because Prum 1997 mathematically rules out survival rates as an explanation for these traits. Interestingly, McMahan 2007a appeals in a broad sense to the “evolutionary” (104) and “adaptive” (113) advantages of beauty.

²⁰ See also Wantanabe, Sakamoto and Wakita (1995).

²¹ We may even have to start calling smells and tastes beautiful, *pace* Aquinas’s understanding of our habits of speech (*Summa* Part 2.1. Q [27] Art.1.Rep.Obj.3, quoted in note 11). Moreover, Hume’s analogy of multi-flavor mixtures ([1757] 1965, 12, quoted in note 7) or the anecdote in *Don Quixote* of the two men who could taste traces of metal and leather in a cup sampled from a large barrel of wine ([1757] 1965, 10-11) suggest that experiments about the physical sense of taste could be quite subtle. For more on the anecdote and its relation to Hume’s aesthetics, see Kuhlenkampff 1990, 95-96; Williams 2000, 256-258.