

Aesthetics as Pre-linguistic Knowledge: A Psychological Perspective

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Introduction

As an emerging field distinct from architecture and the fine arts, proponents of design have sought the theoretical underpinnings necessary to establish it as a discipline in its own right. Perspectives from other disciplines, particularly the two broad areas of science and cultural studies, influenced this pursuit of “design theory.” Scientific influences were prevalent at various times, derived from such fields as materials science, engineering, and ergonomics/human factors, particularly in application to industrial design. These influences also permeated attempts to describe design as a scientific activity, and to identify a method of design that would follow similar principles to those characteristic of the scientific method.¹ However, both designers and design theorists challenged the concept of design practice as a scientific activity, instead advocating various conceptions of “design thinking” and the search for “an epistemology of practice implicit in the artistic, intuitive processes which some practitioners do bring to situations of uncertainty.”²

Such an “epistemology of practice” does not fit comfortably with the current emphasis on the social and cultural analysis of design as manifest in products and “commodities.” Within this paradigm, material culture and its artifacts provide a coded system indicating social identity. Numerous theoretical articulations of this are available, with a lineage stretching back to Veblen. While such analyses provide insight into socially and culturally specific aspects of design, and designed objects in particular, they are susceptible to the criticism that they are culture specific.³ Nonetheless, they tell us much about late and current Western culture, and our shifting positions as receivers or consumers of culture.

Of recent theorists, Buchanan is notable for his broad overview of design and the multifaceted structure that he provides. Within this, he observes that “the desirability of products has proven to be more complex than it was thought to be in earlier design theory. Aesthetics plays a role, but the deeper problem seems to be one of ‘identification.’”⁴ “Identification” alludes to questions of social standing and identity, and the way that products may reflect lifestyle and social positioning. Clearly, this is an important factor, particularly in Western societies, with their scope for choice and

1 N. Cross, “Designerly Ways of Knowing: Design Discipline Versus Design Science,” *Design Issues* 17:3 (2001): 51–52.

2 *Ibid.*, 53.

3 J. Evans and S. Hall, “What Is Visual Culture?” in *Visual Culture: The Reader*, J. Evans and S. Hall, eds. (London: Sage Publications, 1999), 2.

4 R. Buchanan, “Design Research and the New Learning,” *Design Issues* 17:4 (2001): 16.

identity creation. However, and contrary to Buchanan's view, it is contended here that the role of aesthetics is much less understood and constitutes the "deeper problem." Aesthetics remains the intractable problem, ubiquitous in its prevalence, yet resistant to analysis. All design fields deal explicitly with the aesthetic. This is a defining characteristic of design, and constitutes a fundamental omission in attempts to construct design theory. It is this omission that is the focus of this paper.

The very term "aesthetics" is misleading. Originally coined by Baumgarten in 1735 to refer to the philosophical pursuit of laws pertaining to art, it has generated a raft of theorizing, largely within philosophy but also within art theory. Within this, questions pertaining to beauty, harmony, and art dominated.⁵ However, in its earlier classical Greek meaning it referred to sensory-perceptual knowledge (*aisthêsis*), as distinct from intellectual/linguistic knowledge (*noêsis*)⁶—a distinction that is consistent with the argument to be advanced here. To position this historically, it was not until after the European Renaissance that "taste" lost its literal, gustatory meaning and became associated with "artistic" judgment. Also, at this time, the association of the term "art" with painting, sculpture, and architecture evolved, later to be extended to include poetry and music, into what now are termed the "fine arts." Art, as we understand it now, has been around for less than three hundred years. Even the notion of "disinterested aesthetic appreciation" has an eighteenth century Western origin, with a minority application within a minority culture. This preoccupation has been misleading. Aesthetics finds expression in the design appearance of everyday things. It is contended here that the domain of aesthetics over-focused on these post-Renaissance category members, and failed to appreciate the extent of the phenomena. Similarly, the dimensions of meaning favored in this domain were narrowly focused, again representing the more Eurocentric and elite response categories (beauty, harmony). The displacement of the classical Greek meaning of *aisthêsis* has not assisted. This paper, and the model of aesthetics that it outlines, approaches aesthetic perception in line with the broader classical Greek notion, rather than the more common, narrow definition pertaining to art. Furthermore, it approaches aesthetics from perhaps the unusual standpoint of experimental psychology; that is, from a vantage point in which theory construction must be subject to experimental verification. In so doing, it draws heavily upon research in cognitive psychology and neurophysiology. The intention is to provide a model of aesthetics that is conceptually useful to designers.

Reflecting the notorious difficulty of the subject, aesthetics has not fared well in twentieth-century psychology, while in philosophy it has fared little better, being, as Sparshott⁷ observed, "more generally despised than any other branch of philosophical enquiry." The dominance of behaviorism and later cognitivism relegated aesthetics

5 F. E. Sparshott, *The Structure of Aesthetics* (London: Routledge and Kegan Paul, 1963).

6 J. Rée, *I See a Voice* (London: Harper Collins, 1999).

7 *Ibid.*

to obscurity, despite its illustrious beginnings in 1876 as the second published area of experimental psychology. Theoretical resources for probing aesthetics were problematic, and this largely was due to the dissociation of emotion from cognition by both behaviorism and cognitivism, the dominant theories in psychology since the early twentieth century. Emotion was considered “noise” within the system. Before the twentieth century, however, the dominant theories of the mind were essentially perceptual, in which images and sensory meaning provided the foundation of knowledge. The emergence of language theorists and behaviorism in the early twentieth century, followed by the cognitive revolution in the mid-twentieth century, effectively undermined the perceptualist position. This period also witnessed the demise of emotion as a mainstream psychological domain and, as might be expected, aesthetics as a quasi-emotion followed emotion down. Over the past two decades, however, neurophysiological research into brain functioning and the recognition of the primacy of emotion precipitated a resurgence of research into emotion. In parallel, the perceptualist position advanced and, with it, notions of aesthetics that rely less upon a mentalist-linguistic rationale. Furthermore, the “new” aesthetics is less reliant upon object analysis, material culture, and critique—and more upon perceptual knowledge and its articulation. The purpose of this paper is to describe one such perceptualist theory, and to elucidate its application within design.

The model that this paper describes, the “categorical-motivational model,” advances the notion of aesthetics as pre-linguistic cognition, as a form of “knowing” that preceded the evolution of language. It is contended that the function of aesthetics is to elaborate the categories by which we understand the world, by attaching emotion to sensory perceptions. Before the evolution of language, this function would result in the creation of units of “affective knowledge” that would “motivate appropriate action”⁸ to objects in the external world. With the evolution of language and its associated knowledge, this underlying function remains, but coexists with the more “conscious” form of linguistic knowing. However, as will be discussed later, sensory-perceptual knowledge is by no means a poor relation to linguistic-based knowledge. On the contrary, it constitutes the dominant form of knowledge, and provides the very foundation for its linguistic add-on.

The categorical-motivation model derives from two main sources. First, it reconciles two opposing theories within psychology, what will be termed the motivational model and the categorical model. Secondly, it relies heavily upon the notion of sensory-perceptual knowledge and, in so doing, reverts to the classical Greek concept of aesthetics.

8 P. M. Niedenthal, J. B. Halberstadt, and A. H. Innes-Ker, “Emotional Response Categorization,” *Psychological Review* 106 (1999): 337–361.

The Motivational Model

The most comprehensive theory of aesthetics to emerge from mainstream psychology came from Berlyne.⁹ He asked the questions: “Why do we engage in aesthetic activities? What motivates us—and what are the rewards?” These are not unreasonable questions, and ones to which psychology should provide some answers. After all, aside from professional designers and artists, millions of people engage in listening to or performing music, designing, and artistic pursuits. The range and diversity of activities would be difficult to account for via critical theory analyses alone.

Berlyne conceived of aesthetic activities as an elaborate form of play in which a mild form of pleasure would be induced. Central to Berlyne’s theory was the notion of “physiological” arousal and the need to maintain a level that is neither too high nor too low. Three types of sensation induce arousal: psychophysical, ecological, and collative. Psychophysical refers to such properties of stimuli as levels of noise and brightness of color. Ecological refers to events taking place around us, and in which social factors would be accommodated. Collative sensations interested Berlyne, and it was on these that he focused. Collative refers to comparisons between either stimulus elements, which render the stimulus more or less complex; or aspects of experiences, which render the stimulus more or less novel. Berlyne hypothesized that collative stimuli inducing a moderate level of arousal will be found pleasurable, while those inducing a very low or very high level of arousal will be found less pleasurable. This relates to the notion of pleasure involving the “right” amount of stimulus rather than too much or too little. Berlyne’s position found support from neurophysiological studies indicating that arousal levels activated pleasure and aversion centers within the brain.¹⁰

In relation to design, Berlyne’s model posits that we should seek exposure to novel or new experiences that attain a desired level of arousal. The underlying motivation is built into humans as the need to explore and, in so doing, to assimilate new information. As information-seeking animals, the quest for sensory-perceptual novelty probably is wired in to the brain. From the standpoint of the designer, the pursuit of novelty is consistent with the quest for “new” designs and, from the standpoint of the receiver, the positive receptivity to such new designs. However, in line with Berlyne’s model, such experiences should not be so novel as to extend beyond an intermediate level, otherwise they become aversive. Effectively, novelty must be clearly founded in the familiar.

The Categorical Model

While a number of studies within experimental psychology provided support for Berlyne’s theory, by the 1970s, a growing body of results was inconsistent. Most of the research supporting Berlyne’s model derived from studies involving people’s responses to stimuli that normally only would be encountered in an experimental situation;

9 D. E. Berlyne, *Aesthetics and Psychobiology* (New York: Appleton-Century-Crofts, 1971).

10 J. Olds and P. Milner, “Positive Reinforcement Produced by Electrical Stimulation of Septal Area and other Regions of Rat Brain,” *Journal of Comparative Physiology* 47 (1954): 419–427.

- 11 T. W. A. Whitfield and P. E. Slatter, "The Effects of Categorization and Prototypicality on Aesthetic Choice in a Furniture Selection Task," *British Journal of Psychology* 70 (1979): 65–75.
- 12 Ibid.
- 13 D. P. A. O'Hare, "Individual Differences in Perceived Similarity and Preference for Visual Art: A Multidimensional Scaling Analysis," *Perception and Psychophysics* 20 (1976): 445–452; D. P. A. O'Hare and I. E. Gordon, "Dimensions of the Perception of Art: Verbal Scales and Similarity Judgements," *Scandinavian Journal of Psychology* 18 (1977): 66–70; P. Hekkert and P. C. W. van Wieringen, "Complexity and Prototypicality as Determinants of the Appraisal of Cubist Paintings," *British Journal of Psychology* 81 (1990): 483–495.
- 14 T. Gärling, "The Structural Analysis of Environmental Perception and Cognition: A Multidimensional Scaling Approach," *Environment and Behaviour* 8 (1976): 385–415; A. T. Purcell, "The Aesthetic Experience and Mundane Reality" in *Cognitive Processes in the Perception of Art*, W. R. Crozier and A. J. Chapman, eds., (Amsterdam: North-Holland, 1984); D. M. Pedersen, "Perception of Interior Designs," *Perceptual and Motor Skills* 63 (1986): 671–676.
- 15 J. H. Langlois and L. A. Roggman, "Attractive Faces Are Only Average," *Psychological Science* 1 (1990): 115–121.
- 16 C. Martindale and K. Moore, "Priming, Prototypicality, and Preference," *Journal of Experimental Psychology: Human Perception and Performance* 14 (1988): 661–670.
- 17 P. Hekkert, K. Morel, and D. Snelders, "Typicality, Originality, and Aesthetic Preference," *Proceedings of the XIVth Congress of the International Association of Empirical Aesthetics* (Prague, 1996, unpublished).
- 18 J. C. Ward, M. J. Bitner, and J. Barnes, "Measuring the Prototypicality and Meaning of Retail Environments," *Journal of Retailing* 68 (1992): 194–220.
- 19 B. Loken and J. Ward, "Alternative Approaches to Understanding the Determinants of Typicality," *Journal of Consumer Research* 17 (1990): 111–126.

for example, dot patterns and random polygons, the type of atomistic material then favored in experimental psychology. While Berlyne's model achieved success in explaining the results of experiments using such stimuli, it had difficulty with research that involved responses to real-world objects such as paintings, buildings, and furniture. These latter studies showed that the category to which the stimulus belonged exerted a powerful influence on people's aesthetic responses.

Whitfield and Slatter¹¹ advanced the "categorical model" in 1979 to account for these discrepant findings. They explained the effect of categories on people's aesthetic responses by adopting a cognitive interpretation, as opposed to Berlyne's motivational approach. They argued that objects are not evaluated per se, but rather are judged in relation to the cognitive category accessed. Effectively, stimuli are processed via categorical mediation, meaning that the way people respond aesthetically to objects will be determined by the categories they already have developed for understanding such objects—after all, this is how perceptual cognition operates. In addition, the extent to which a stimulus is typical—or prototypic—of the category accessed determines affect, whereby people will find more pleasure in objects that fit well into their predetermined categories. In other words, a chair is not evaluated as a discrete chair, but rather as a member of the cognitive category "chair." Furthermore, the more typical—or prototypic—an individual chair is of the cognitive category "chair," the higher the evaluation of it. Termed "preference-for-prototypes," this hypothesis has been remarkably robust in predicting people's evaluations of a wide range of objects, from furniture,¹² paintings,¹³ and buildings,¹⁴ to faces¹⁵ and colors.¹⁶ Notably, it also found explicit application in the area of design to explain people's evaluations of telephones,¹⁷ retail fast-food environments,¹⁸ consumer products,¹⁹ and "brands."²⁰

In its application to design, the categorical model posits that we should seek exposure to designs that conform to expectations. Effectively, a chair should correspond to our internal cognitive representation of "chair." A chair should look like a chair, and a piano should look like a piano; just as apples should look like apples, and tomatoes like tomatoes. At a more differentiated category level, a Georgian chair should look like a Georgian chair, and a grand piano should look like a grand piano. This is the converse of Berlyne's model favoring novelty. The categorical model posits that we like what we know, that pleasure is generated by the confirmation of expectations, and that familiarity breeds pleasure—as distinct from contempt.

The Categorical-Motivation Model

Clearly, the models make conflicting predictions. The motivational model predicts that a moderate discrepancy from expectations—novelty—will be favored, while the categorical model predicts that

a confirmation of expectations—prototypicality—will be favored. Given that empirical evidence supports both positions, though skewed towards the latter for real objects, a theoretical reconciliation was required. The “categorical-motivation model” was conceived as a merger of these two conflicting theories. Following initial attempts in the 1980s,²¹ a coherent formulation was offered in 2000.²²

The categorical-motivation model is bipolar. At one extreme are categories that largely are formed and closed to further articulation, while at the other extreme are categories that are ill-formed and open to further articulation. The concepts of “closure” and “openness” are crucial.

Closed Categories

Closed categories are of two types: those that are “wired in” and provide part of the genetic infrastructure upon which further associations can be constructed; and those that have achieved completion via learning. In the former type, it is notable that preferences exist for faces and landscapes that largely transcend cultural differences. This suggests that wired-in categories had evolutionary value and became genetically imprinted.²³ In the latter type, closed categories are existing “knowledge” structures that require no further refinement. Examples of these will be person-specific; however, and within the “cultural” domain, medieval cathedrals and Renaissance paintings are likely to be closed categories to a Western-educated audience. It is difficult to conceive of novel examples of each category emerging. In the domain of design, the ubiquitous Coca-Cola brand and Marlboro cigarettes probably are fixed, closed categories to most people, which may account for the difficulty of redesigning them while retaining their appeal. With closed categories, the more prototypic an object is of that category, the more highly it is evaluated. In the case of natural objects such as trees, apples, dogs, and tomatoes, an entire range of objects exists in which preference-for-prototypes will prevail. In other words, we like apples to look like apples, dogs to look like dogs, etc. It is known that the brain processes prototypes more rapidly than non-prototypes. With regard to closed categories, pleasure is better explained either by the speed with which we can classify stimuli or by their intrinsically wired-in desirability. Before the acquisition of language and culture, all objects would have been “natural.” The brain evolved within this pre-linguistic and pre-cultural environment. Its modus operandi did not shift to accommodate designed objects: rather, designed objects must accommodate it.

Open Categories

At the opposite end of the spectrum are categories that are open and unformed, though with sufficient redundancies such that categorization can take place: objects of maximum novelty would be unrecognizable and therefore meaningless. Examples of such open categories again will be person-specific; however, to a Western-educated audi-

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- 20 P. Nedungadi and J. Hutchinson, “The Prototypicality of Brands: Relationships with Brand Awareness, Preference, and Usage” in *Advances in Consumer Research*, E. Hirschman and M. Holbrook, eds., 12 (1985): 498–503.
- 21 T. W. A. Whitfield, “Predicting Preference for Familiar, Everyday Objects: An Experimental Confrontation between Two Theories of Aesthetic Behavior,” *Journal of Environmental Psychology* 3 (1983): 221–237.
- 22 T. W. A. Whitfield, “Beyond Prototypicality: Towards a Categorical-Motivation Model of Aesthetics,” *Empirical Studies of the Arts* 18 (2000): 1–11.
- 23 J. F. Wohlwill, “Environmental Aesthetics: The Environment as a Source of Affect” in *Human Behavior and Environment* Vol. 1, I. Altman and J. F. Wohlwill, eds. (New York: Plenum Press, 1976); and J. H. Langlois and L. A. Roggman, “Attractive Faces Are Only Average.”

ence “modern architecture” and avant-garde paintings no doubt would qualify as open categories. In the domain of design, examples could include mobile phones and computer printers. In neither case will well-formed categories exist. The clearest examples of open categories, however, derive from childhood learning, and involve the full spectrum of the recognition of objects and their associated performance characteristics. For a child, this must take place not only with natural objects, but since the advent of culture and its artifacts, with designed objects as well. The positive affective value of stimuli applicable to this area of the model would be in the further articulation of categories, the creation of “knowledge.” Effectively, people see or experience something that they have not seen or experienced before, but this “new” item has enough resemblance to items already experienced that it provides new knowledge of its type—it extends the category structure. We can account for the pleasure involved in this aspect of aesthetic experience in terms of arousal. Novel stimuli generate greater arousal in their complexity of relation to other stimuli and past experience, though not too much (unrecognizable) or too little (mundane). The processing of novel stimuli ultimately results in the formation or refinement of prototypes, as the category progresses along the spectrum away from the extreme of open and ill formed towards that of well formed.

In application to design, the categorical-motivation model positions the designer in a conceptual space within the range from open to closed categories—and categories that are both person- and culture-specific. Negotiating the hurdles of delivering a designed product within this space is no mean feat. At one extreme, the powerful constraints of existing category prototypes must be contended with, and at the other extreme, the creation of categorical meaning where little or none exists.

Categorization

Given the centrality of categorization within the categorical-motivation model, it will be useful to describe it in more detail and to position aesthetics within this framework. Categorization was a major research domain within cognitive psychology in the 1970s and, given its origin at that time, formed the basis for the categorical model. A fundamental tenet of this perspective is that categorization is one of the basic functions of life—one of the elemental ways in which we form meaning. Categorization involves grouping objects together as similar, and distinguishing them from other objects. It further involves being able to identify new objects that we have not seen before, and assigning them to a category. For example, while we have seen many trees, we will see trees that we have not seen before. How does the brain recognize new trees? What are the processes involved? And, more important, how does the brain categorize them so quickly? Research into categorization tackled such problems, and provided answers in the form of inter- and intra-category

structure. Central to such structures were prototypes. These are the “best” examples of each category in that they share more features in common with other category members. In addition, the brain processes them more quickly.

We do not respond to an object per se, but rather to its position within a category structure. To place this in a design context, the function of design theory is to assist us in assimilating new material into existing category structures. Categories do not exist in isolation: they exist as interlocking and connected structures. Design theory provides linkages within our category structures that enable assimilation: in this sense, we then “understand” the new item, i.e., we can position it in terms of categorical meaningfulness. In doing so, we also extend our category structure—we expand it and articulate further connections, i.e., we therefore “understand” more.

From a sensory-perceptual perspective, the capacity to recognize (i.e., categorize), say, a dog and distinguish it from a tree is knowledge—fundamental knowledge. The ability to find one’s way home is sensory-perceptual-spatial knowledge (a kind of environmental categorization), and is essential for survival—as is the capacity to distinguish between a rabbit and a tiger; after all, we eat rabbits, but tigers eat us. This is not insignificant knowledge. Sensory-perceptual knowledge is not trivial: it involves feats of highly sophisticated brain processing that we have evolved to execute with consummate ease. Because the brain has evolved to be effective, it puts little store in our ability to understand the processes. As LeDoux²⁴ points out, in brain processing, the conscious is the exception and not the rule. Furthermore, such sensory-perceptual knowledge is not limited simply to object recognition. Such processing goes beyond object recognition, and embraces object performance. That is why we know that trees cannot run up and bite us, while dogs can. This is not linguistic knowledge. Even dogs know this!

Research into categorization has expanded considerably since its initial focus upon taxonomies of objects and the identification of category-prototype structure.²⁵ Categorization now incorporates goal-derived categories, a concept put forward by Barsalou, whereby categories consist of items that do not necessarily have features in common, other than that they relate to a particular goal, such as “things to take from one’s home during a fire.”²⁶ Emotional categories²⁷ and intentionalist²⁸ categories also have been identified. The latter are pertinent to design, and recognize that the intention behind the design of an object is a further categorical variable.

Aesthetic Categories

Significantly, the debate on categorization tells us nothing about aesthetics and little about effect. Aesthetics as a differentiated category neither has been advocated nor elucidated. If we accept that there are taxonomic, goal-derived, intentionalist, emotional, and

24 J. LeDoux, *The Emotional Brain: The Mysterious Underpinnings of Emotional Life* (New York: Simon and Schuster, 1996).

25 E. Rosch, “On the Internal Structure of Perception and Semantic Categories” in *Cognitive Development and the Acquisition of Language*, T. E. Moore, ed. (New York: Academic Press, 1973); and E. Rosch and C. B. Mervis, “Family Resemblances: Studies in the Internal Structure of Categories,” *Cognitive Psychology* 7 (1975): 573–605.

26 L. W. Barsalou, “Ideals, Central Tendency, and Frequency of Instantiation as Determinants of Graded Structure in Categories,” *Journal of Experimental Psychology: Learning, Memory, and Cognition* 11 (1985): 629–654.

27 P. M. Niedenthal, J. B. Halberstadt, and A. H. Innes-Ker, “Emotional Response Categorization.”

28 P. Bloom, “Intention, History, and Artifact Concepts,” *Cognition* 60 (1996): 1–29; and J. Levinson, “Extending Art Historically,” *Journal of Aesthetics and Art Criticism* 51 (1993): 411–423.

possibly aesthetic categories, then where do we position aesthetic categories? Aesthetic categories appear neither primarily taxonomic, goal-derived, intentionalist, nor necessarily emotional; rather they appear as sensory-perceptual categories involving essentially nonverbal sensory material. An aesthetic category is intrinsically sensory-perceptual and lacking in semantic content; that is how we seem to understand the meaning of the term aesthetic. Furthermore, aesthetic categories are not fixed in terms of content—clearly they are elastic in their flexibility to absorb change (e.g., fashions).

Similarities do exist between aesthetics and emotion. A distinctive feature of aesthetics, like emotion, is that it results from an engagement with normal objects—though, like emotion, to a greater or lesser extent. There are objects whose primary function could be stated as aesthetic, such as Beethoven's symphonies, as well as objects whose aesthetic function is shared with other functions, such as the exterior styling of a new Chrysler car, through to objects whose aesthetic function is only minor. Also, there are aesthetic categories that are well formed and largely closed to further articulation, such as Renaissance paintings to a Western-educated audience, and others that are relatively unformed and therefore open to further articulation, such as avant-garde paintings. Characteristics that aesthetics shares with emotion are diffuseness and the fact that they cannot be evaluated for correctness. These characteristics indicate the degree to which aesthetic experiences are unlike cognition, and perhaps shed some light on the difficulty of describing such phenomena as "design processes" and "design thinking."

We might surmise that aesthetic categories are defined by the emotions that aesthetic experiences evoke, as has been suggested.²⁹ A problem is that some appear to evoke emotion, while others appear not to. For example, the "blues" may evoke emotion, but does the exterior styling of a new car? Both are aesthetic phenomena. Furthermore, if aesthetic categories are similar to emotional categories, we might assume that they share similar category-based goals. Ross has outlined the goals of emotional categories as "inference, prediction, explanation, and problem solving."³⁰ Thus, is emotional categorization a source of knowledge that allows us to understand and respond to our surroundings? It is contended here that aesthetics indeed does share these characteristics with emotion, but that aesthetics has the specific function of elaborating our category system via the attachment of emotion to cognition. It is further contended that aesthetics is neither essentially cognitive (as we understand it via linguistic cognition) nor emotional (again, as we understand it via linguistic cognition), but rather that it derives from a pre-linguistic-cognitive stage of human evolution—a kind of precognitive cognition. For this reason, it has proven very difficult to articulate linguistically.

29 P. M. Niedenthal, J. B. Halberstadt, and A. H. Innes-Ker, "Emotional Response Categorization."

30 B. H. Ross, "The Effects of Category Use on Learned Categories," *Memory and Cognition* 28 (2000): 51–68.

Social and Evolutionary Theories

It can be argued that aesthetics is fundamental to human life simply by observing the extent to which people design their environments. There exists a powerful drive to control the visual appearance of all artifacts, habitats, and selves. It is difficult to find artifacts, habitats, and selves that have not been subject to decoration/design, and it is virtually impossible to find manufactured objects without a designed aesthetic component. The urge to control the appearance of surfaces—color, shape, pattern, and texture—is so endemic that it cannot be overlooked.

Social theorists explain the drive to control visual appearance by contending that aesthetics serves a display function, signaling position within the social group. Effectively, material culture and its artifacts provide a coded system indicating social identity. However, evidence indicates that aesthetics cannot be fully accounted for as social construction. For example, people will respond aesthetically to stimuli that, from a social standpoint, lack “real world” applications. It has been demonstrated conclusively that people will, when presented with the most disembodied of stimuli (colors, lines, polygons, etc.), make affective/aesthetic judgments, and indeed that the task of doing so is apparently meaningful to them.

Evolutionary theorists adopt a somewhat similar, though more biological, approach as social theorists. They account for the existence and appreciation of aesthetics (essentially art and ornamentation) as a ritualistic social device or as a biological mate signaling system. The latter, in its more focused form, has even been postulated as originating in female cosmetic fertility signals.³¹ These theorists tend to see the arts primarily as avenues for competitive display, to enhance status and thereby sexual selection. Unfortunately, such approaches fail to account for the diversity of aesthetic phenomena, their capacity for change, and the extent of both individual and cultural differences.

There is little doubt that a social element exists for aesthetics, and one that may also impact upon the biological function of sexual selection. The inevitable question concerns the extent to which aesthetic choices are socially, or indeed biologically, constructed. With regard to the evolutionary perspective, this paper contends that the elaborate objects we produce are not necessarily “skill displays” for mating purposes, but natural extensions of our need to attribute “good-bad” to all sensory experiences. In terms of social codification, the categorical-motivation model allows for the socially constructed realm of aesthetics. The position it adopts is that the function of aesthetics predates both language acquisition and “decoration”; effectively, it predates social organization as we understand it. However, as social organization and its artifacts arose, then the application of aesthetics to satisfy social goals would be anticipated; as would its application to the new forms of communication and display brought about by the evolution of language. Thus, the new

31 C. Power, “Beauty Magic: The Origins of Art” in *The Evolution of Culture*, R. Dunbar, C. Knight, and C. Power, eds., (New Jersey: Rutgers University Press, 1999).

medium of language has been aestheticized (literature, poetry), as has aural communication (music) and also movement (dance, ballet). Even within mathematics, that most post-linguistic medium of communication, the “elegance” and “beauty” of solutions are espoused.

Pre-linguistic Knowledge

The origin of language is pertinent to the concept of aesthetics as pre-linguistic knowledge. Disagreement exists as to the precise evolutionary origin of language. Positioning the point at which complex languages began ranges from approximately 200,000 to 50,000 years ago. The earlier estimation derives from fossil records indicating that the physiology only then was in place to enable complex language sounds to be made. The latter derives from the emergence of artifacts and decoration approximately 50,000 years ago, and has been interpreted as evidence of language-based symbolic behavior.³² Since spoken languages leave no physical trace, the area has a long and contentious history. In 1878, the French Academy of Science even banned its discussion. However, while there is disagreement over the temporal origins of language, it is agreed that a pre-linguistic state existed. In this lengthy period of hominid/human evolution, the question of “knowing” exists. In what form did “knowing” exist in the absence of linguistic cognition? Bickerton³³ argues that language is fundamental “to all distinctively human thought and consciousness.” Also, Dennett³⁴ considers that “thought and language are a direct product of language capacity.” Interestingly, Corballis³⁵ recently argued that the origin of spoken language derives from visual signals: effectively, spoken language evolved as an elaboration of hand signals. This is a difficult area to investigate, given that there are no pre-linguistic survivors to interrogate and introspection has its limits. The evidence for pre-linguistic knowledge/aesthetics is circumstantial, but worthy of consideration.

Disembodied Stimuli

If little else, research in experimental psychology has demonstrated conclusively that people will, when presented with the most disembodied of stimuli (colors, lines, polygons, etc.), make aesthetic judgments. Despite reservations as to the precise interpretations made,³⁶ the task is apparently meaningful to them. This suggests that, for a stimulus to elicit an aesthetic response, it needs to be no more than merely taxonomic. In fact, it needs hardly be taxonomic. The popular classes of disembodied stimuli characteristic of empirical research in aesthetics (e.g., color chips, polygons) are, at most, taxonomic. However, these are not objects in the accepted sense: rather, they are attributes of objects, the building blocks from which objects are constructed within perceptual cognition. Furthermore, as categorical entities, they clearly lack “goal-directedness.” For example, polygons hardly would qualify as “things to take from one’s home

32 C. Holden, “No Last Word on Language Origins,” *Science* 282 (1998): 1455–1458.

33 D. Bickerton, *Language and Human Behavior* (Seattle: University of Washington Press, 1995).

34 D. Dennett, *Consciousness Explained* (Boston: Little Brown, 1991).

35 M. Corballis, “The Gestural Origins of Language,” *American Scientist* 87 (1999): 138–145.

36 T. W. A. Whitfield and T. J. Wiltshire, “Color Psychology: A Critical Review,” *Genetic, Social, and General Psychology Monographs* 116 (1990): 385–411.

during a fire.”³⁷ Similarly, they have no “intentionalist” identity:³⁸ no one makes polygons. And from a social standpoint, they lack “real world” anticipations of outcomes: as such, they are incapable of generating actual or conceived preferences. The social determinist explanation offered for “real world” objects, therefore, cannot be offered for “disembodied” stimuli. Polygons, after all, have no signifier status and offer little opportunity for “conspicuous consumption”: no one buys or covets polygons. Significantly, however, the fact that people will make affective/aesthetic judgments of such anodyne, meaningless stimuli is interesting. If such socially and cognitively impoverished stimuli can elicit aesthetic appraisal, then it is plausible to assume that all stimuli can.

The “Mere Exposure” Effect

In what is now a classic study, Zajonc³⁹ demonstrated that, by simply showing people what to them was a meaningless object, a Chinese pictogram, that it influenced their preferences when shown a range of similar pictograms. The pictogram previously seen was more likely to be preferred, even though subjects in the experiment could not remember seeing it. Zajonc’s results have been independently replicated more than two hundred times.⁴⁰ This effect indicates that positive aesthetic responses to an object can be induced by “mere exposure”—an effect that advertisers have intuitively recognized. Interestingly, Zajonc took this a step further by preexposing people to a pictogram for such a short interval (milliseconds) that they actually saw nothing.⁴¹ The same effect was observed. When asked to explain their preferences, people gave various reasons to do with the design properties of the respective pictograms—all clearly spurious. The significance of this research is that it demonstrates that “liking” something does not even require perceptual cognition. Not only could people not remember seeing the preexposed pictogram, *they didn’t actually see anything*. This raised the obvious question that, if the perceptual/cognitive system did not see it, then how did the brain detect it. After all, the preexposures generated an aesthetic liking. Something in the brain must have seen it, but what and how?

The answer to this intriguing question began to emerge very recently from the field of neurophysiological research. LeDoux,⁴² among others, has demonstrated that a part of the midbrain called the amygdala has a direct, “fast-track” connection to the eye. The amygdala picks up information more quickly than the cognitive system, and even detects information that the cognitive centers cannot, as in the case of Zajonc’s preexposure studies. However, and significantly, the amygdala is an emotion agent. It attaches emotion to incoming information, both positive and negative, and relays this to other parts of the brain including the cognitive centers. Significantly, it also is a powerful and primitive agent, strongly implicated in experiences of fear and pleasure. One of its functions is to

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- 37 L. W. Barsalou, “Ideals, Central Tendency, and Frequency of Instantiation as Determinants of Graded Structure in Categories.”
- 38 P. Bloom, “Intention, History, and Artifact Concepts.”
- 39 R. B. Zajonc, “Attitudinal Effects of Mere Exposure,” *Journal of Personality and Social Psychology* (1968, Monograph Supplement 9): 1–27.
- 40 R. F. Bornstein, “Exposure and Affect: Overview and Meta-analysis of Research, 1968–1987,” *Psychological Bulletin* 106 (1989): 265–280.
- 41 R. B. Zajonc, “Feeling and Thinking: Closing the Debate over the Independence of Affect” in *Feeling and Thinking: The Role of Affect in Social Cognition*, J. P. Forgas, ed. (Cambridge: Cambridge University Press, 2000).
- 42 J. LeDoux, “Emotion and the Amygdala” in *The Amygdala: Neurobiological Aspects of Emotion, Mystery, and Mental Dysfunction*, J. P. Aggleton, ed. (New York: Wiley, 1992); J. LeDoux, “Cognitive-Emotional Interactions in the Brain” in *The Nature of Emotion*, P. Ekman and R. J. Davidson, eds. (Oxford: Oxford University Press, 1994); J. LeDoux, *The Emotional Brain: The Mysterious Underpinnings of Emotional Life*, and A. R. Damasio, “A Second Chance for Emotion” in *Cognitive Neuroscience of Emotion*, R. D. Lane and L. Nadel, eds. (New York: Oxford University Press, 2000).

“modulate cognition with emotion.”⁴³ Perhaps most significantly, we have no conscious access to the actions of the amygdala. We cannot introspect and ascertain its workings. Why? From an evolutionary standpoint, the emotion system has features that alert the organism for swift action. To be subject to introspective analysis was clearly irrelevant: the trade-off for accessibility was speed. Detailed processing is time-consuming.

From the standpoint of categorization and aesthetics, the “modulation of cognition by emotion” is not something that we consciously control. It happens to us: we do not make it happen. It is simply not important to the brain that we have access to this. And this is true for the actions of designers with aesthetics. This is not to suggest that they are incapable of providing some insight: rather it states that much probably will be inaccessible to them. This may account for the difficulty of analyzing the processes by which designers arrive at a design, and why a scientific approach to design may be implausible.

Synaesthesia

Synaesthesia fits well within the model of pre-linguistic cognition. It is the phenomenon whereby sensory experience “crosses over” between different senses. The most common form of this is “colored hearing.” People with this form of synaesthesia see colors while hearing particular sounds. Synaesthesia probably is evolutionarily older than ontologically separate sense perceptions, and certainly would have occurred before the advent of language.⁴⁴ The function of synaesthesia might have been to provide additional cross-modal sensory information about the environment in a more efficient way than completely separate sense perceptions. Some have argued that synaesthesia is a part of normal limbic system functioning of which we are unaware, while others maintain that it is an ability that, interestingly, recedes into latency with the child’s development of language.⁴⁵

A number of cross-modal sensory associations remain in a weaker form of synaesthesia. This is most evident in the association of color (vision) with dimensions such as warm/cool (touch) and loud/quiet (hearing). It even has been argued that synaesthetic perception lays the foundation for the development of analogy and metaphor as expressed through language. Williams, in his analysis of the development of the English language, contends that not only do inappropriate metaphors not hold (i.e., they drop out of use remarkably quickly), but changes in word usage develop from “the physiologically least differentiating, most evolutionarily primitive sensory modalities to the most differentiating, most advanced, but not vice versa.”⁴⁶ For example, the word “sharp” was first applied to touch, followed by taste, and finally hearing and visual shape. Significantly, this development does not occur in reverse order.

43 J. LeDoux, “Cognitive-Emotional Interactions in the Brain.”

44 R. E. Cytowic, *The Man Who Tasted Shapes* (London: Abacus, 1998).

45 L. E. Marks, *The Unity of the Senses* (New York: Academic Press, 1978).

46 J. M. Williams, “Synaesthetic Adjectives: A Possible Law of Semantic Change,” *Language* 52 (1976): 464–465.

If we discount the strong form of synaesthesia as an adult rarity, we are left to explain the weaker, associationist form as an apparently universal phenomenon. This appears to be a residue of the strong form, and one that no longer serves any apparent purpose. For example, what now is the advantage of associating apparent temperature (warm-cool) with color? Similarly, for melody, what purpose is now served by our capacity to store and remember such synaesthesia-laden sound sequences as in *Für Elise*? Why are these sound sequences apparently meaningful to us? Do aesthetic categories derive from this cross-modal, sensory-perceptual domain? Do they exist for articulating cross-modal sensory associations—experiences that are not linguistically accessible? Before the development of language, and at an early stage of the species' cognitive development, the capacity to cross-articulate sensory modalities would provide additional sensory-perceptual knowledge.

Theoretical Implications

A key feature of the categorical-motivation model is that it conceives of aesthetics not as an “artistic” aspect of design, but rather as a fundamental process for acquiring and creating knowledge—pre-linguistic knowledge. In line with this, it rejects the post-Baumgarten view of aesthetics, and adopts the classical Greek notion of *aisthêsis* as sensory-perceptual knowledge. The core concept is that categorization involves pleasure. In the context of aesthetics, it is posited that the assimilation of new information to extend, refine, and elaborate the “categories-in-relation” also involves pleasure. The modulation of categories leads to greater fitness for purpose. What we now term “aesthetics” was the *modus operandi* of understanding the external world.

The function of aesthetics appears to be to elaborate our category system via the attachment of emotion to cognition or, to use LeDoux's phrase once again, the “modulating of cognition by emotion.” These combined cognitive-emotion categories are what Damasio⁴⁷ refers to as “somatic markers.” The stored cognitive/emotional knowledge enables us to anticipate how the effect of possible alternative decisions would “feel,” and thus to employ the somatic markers as aids to decision-making.⁴⁸

The categorical-motivation model acknowledges the sensory-perceptual as the dominant form of knowledge, and the intellectual/linguistic as an evolutionary add-on. It should be borne in mind that the hominid/human brain evolved over more than three million years. It invented language between 200,000 and 50,000 years ago. Language is an add-on to a highly sophisticated sensory-perceptual-emotional system. It does not replace the system: language simply provides additional processing resources that the original system found useful. Language is not essential for survival: sensory-perceptual-emotional processing is. In privileging language-based knowledge, we perpetuate Descartes's delusion of

47 A. R. Damasio, “A Second Chance for Emotion.”

48 G. Lindgaard and T. W. A. Whitfield, “Integrating Aesthetics within an Evolutionary and Psychological Framework,” *Ergonomics* (Special Issue: “Theoretical Issues in Ergonomics Science”) (in press).

"I think therefore I am." Damasio powerfully undermines this from a neurophysiological standpoint.⁴⁹ Also, in privileging the cultural in the form of object analysis, we overlook the more fundamental processes that underpin knowledge as sensory-perceptual phenomena. A hierarchy of knowledge exists from the sensory-perceptual to the linguistic, and from this to the cultural. The cultural is rather like the tip of the iceberg, with the fundamental sensory-perceptual knowledge structure underpinning it.

The categorical-motivation model accommodates the cultural domain as an add-on involving the social meaning of designed objects within a given cultural setting at a particular time. Equally important, however, the model moves away from a reliance on purely linguistic and deconstructive modes of understanding. For those who are reticent in accepting the absolute hegemony of language common to much contemporary theorizing, it provides an alternative perspective. And this perspective acknowledges the human brain and its processing strategies as the fundamental agent determining our understanding and evaluation of the world. It is surprising indeed that no less an object than the human brain appears to be overlooked in the construction of design theory.

Perhaps the main implication of the categorical-motivation model for designers is that they share with artists a concern for adding to our sensory-perceptual knowledge. They do so by a process of refinement, elaboration, and construction of a range of sensory-perceptual phenomena. "Knowledge," in this context, refers to new sensory-perceptual experiences that designers are adept at creating. This is achieved by the interweaving of new variants of category knowledge within the constraints of existing category knowledge. Martindale represents this rather neatly in a neural network model involving the hedonic activation of cognitive units. Within this, stimuli that are more prototypic generate greater cognitive activation than less typical stimuli. In application to aesthetic experience, this has evolved into a multifaceted model involving activation of a range of "sensory, gnostic, semantic, and episodic analyzers."⁵⁰ This is the domain in which designers and artists operate. Within this, the concept of "knowledge" is appropriate. The notion of "intellectual," as in the "intellectual content of the design," is a misnomer. "Intellectual" has the hallmark of linguistic cognition: it deceptively leads design into something that it is not, while overlooking the significance of what it is. Does design aesthetics need the imprimatur of the apparently intellectual? Does *aisthêsis* need justification from *noêsis*?

49 A. R. Damasio, *Descartes's Error: Emotion, Reason, and the Human Brain* (New York: Grosset/Putnam, 1994).

50 C. Martindale, "Aesthetics, Psychobiology, and Cognition" in *The Foundations of Aesthetics, Art, and Education*, F. H. Farley and R. W. Neperud, eds. (New York: Praeger, 1988).