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# The visual gamut and syntactic abstraction

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**Abstract:** Charles S. Peirce's second trichotomy, which introduces the concepts of iconicity, indexicality, and symbolicity, is probably the only piece of his semiotic that is familiar to visual artists and designers. Although the concepts have found their way into the academy, their utility in the field has been reduced for a couple of reasons. First, as with all of Peirce's philosophy, his second trichotomy is a concept that is subtle, fluid, and difficult to fully grasp in a sound bite. Second, there has simply been no bridge concept that would form a working connection between that philosophy in its logical guise and the studio practice in the visual arts. The purpose of this article is to remedy that situation by investigating the subtle ways the second trichotomy functions within the visual sphere, and to then suggest a model that can serve to bridge the divide between pure theory and practice. The article makes four main points: first, using examples from visual identity and the graphic arts, it demonstrates how the modes of icon, index, and symbol tend to be blended; second, examples from fine art are used to illustrate how the concept of abstraction, as used in the art world, can only be partially accounted for within the second trichotomy, but can be modeled by supplying a syntactical supplement; third, it expands on and elaborates a previously sketched model, the visual gamut, which makes it possible to classify visual entities according to their position within a map of semantic and syntactic space; finally, it concludes by suggesting ways this enhanced version of the visual gamut model might be used in the analysis of, or creation of, art and design, presenting suggestions for further study.

**Keywords:** abstraction; fine art; graphic design; Peirce; semantics; syntactics; visual gamut

## 1 Introduction

Charles S. Peirce's second trichotomy, which introduces the concepts of iconicity, indexicality, and symbolicity, is probably the only piece of his semiotic that is familiar to visual artists and designers. Although the concepts have found their

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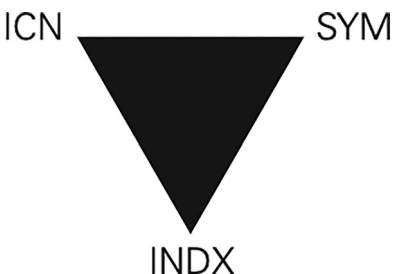
way into the academy, their utility in the field has been limited for a couple of reasons. First, as with all of Peirce's philosophy, his second trichotomy is a concept that is subtle, fluid, and difficult to fully grasp in a sound bite. Second, so far there simply is no bridge concept that would form a working connection between that philosophy in its logical guise and the studio practice of design and the visual arts. The purpose of this article is to remedy that situation by investigating the subtle ways the second trichotomy functions in the visual sphere, and to suggest some notions that can serve to bridge the divide between pure theory and practice.

In particular, this article will expand upon a model called the visual gamut (Figure 1), an analytical tool that has been sketched, in general terms, as a way to map different modes of icon/index/symbol relations in visual entities (Skaggs 2017: 145–159). This article expands the concept of the visual gamut, enhancing it to include the syntactical operations known as abstraction, and locating discrete calibrated blended positions, allowing for a semiotic tool that is more descriptively precise and more useful to the front-end, creative, process. Visual communication is a vast domain with a wide variety of displays. In graphic design, intricate suites such as web sites and magazines can take on the attributes of entire discourses. It's important, in laying out and demonstrating a new theoretical model, to choose examples that are modest in their number of nested sub-parts. Consequently, the examples chosen to guide this discussion are selected from areas in which complexity is somewhat constrained: logo design and abstract paintings. The theoretical model developed here can be applied to any situation, simple or complex, in which Peirce's notions of icon, index, and symbol are relevant.

## 2 Modal variance across, and within, orders of reference

### 2.1 The quixotic nature of the second trichotomy

The ensuing discussion will make frequent mention of two concepts, namely, Peirce's second trichotomy and the visual entity. With his second trichotomy of the



**Figure 1:** The visual gamut.

structure of signs, Peirce introduced the concepts of icon, index, and symbol. These terms describe three distinct ways, or modes, by which signs may relate to their referents. An iconic sign relates to its referent through resemblance, similarity, the sharing of some quality; an indexical sign relates by some proximal, environmental, or physical contact between sign and referent; symbolic relations are based on consensual agreement, prescription, or through observation of habitually recurring systemic patterns (Peirce 1931–1966, hereafter cited as “CP”; CP: 2.292, 2.299).

Visual entities are things which, upon being seen, act as signs. This article will focus on visual entities that are designed, or purposefully planned, although there is nothing in the notion of a visual entity that requires such intentionality. Many visual entities relate to their referents in what might be called “pure” versions of Peirce’s three modes: a photograph of my dog, Max, is iconic in that it looks like Max; the scratch marks near the back yard fence are a sure indication (index) that Max tried to dig under; The letters M-A-X on the water bowl on the kitchen floor inform the viewer just whose water bowl it is through typographic symbols. These clear-cut situations are the kinds of cases that are frequently used in classrooms to explain the icon-index-symbol division, and they are the kind of pure cases Peirce provided in making his conception clear (CP: 2.247–2.249, 2.298).

However, in visual communication, the cases often get more complicated. To understand why a visual gamut is needed as a model, it is helpful to take a concrete example. Suppose I want to design a logo<sup>1</sup> for Max. Functional requirements of a logo place certain constraints on the design; it is important to make the visual entity conspicuous or memorable, yet it must also remain robust should it be reduced to a small size, and one usually prefers the content of the logo to have some conceptual connection with the host.<sup>2</sup> These and other concerns enter into the decision-making process during the evolution of the design of Max’s logo. Thinking of what really typifies Max, I realize his ardent love of scratching prevails over all other Maxian attributes and as a result there could be no better way of representing him than by his claw marks. So I photograph some of his claw marks by the back fence (Figure 2a), convert them to high contrast so they will be robust in use (Figure 2b), and voila! a logo for Max.<sup>3</sup>

But now, is this logo iconic, indexic or symbolic? In the sense that the new graphic device resembles Max’s actual claw marks by the back fence, it is certainly

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**1** A logo is an emblem or other device in which the visual entity stands for, or identifies, its host.

**2** The word “host,” used in the context of visual identification, refers to that person, organization, place or event that is identified by a particular visual entity.

**3** In defense of my design chops, no claim is made that these are excellent logos. The examples are simply used to illustrate certain semiotic points. On the other hand, no one has asked Max what he thinks.



**Figure 2:** A highly detailed photograph of claw marks and a “line art” high contrast version.

iconic. In the sense that it is evidence of Max’s rambunctious physical gesture, it is clearly indexical. In the sense that it is a visual identifier for Max, it is symbolic. So, depending on the respect in which one chooses to regard it, all three modes of relation are active. What is going on here, and if they apparently are so “unstable” as concepts, how can these three modes of icon-index-symbol be more useful, both to the understanding how visual communication works and to the creative process of designing?

## 2.2 Three orders of reference

To re-stabilize the concepts we begin by distinguishing certain levels within which a sign does its job of referring. There are three respects (Peirce also uses the term “grounds”) in which the logo is likely to be considered. These belong to different *orders of reference*. First order reference is that which is fundamentally purposeful in the communication. For instance, in the case of a logo, first order reference applies to its primary purpose of designating its host, much as a proper name does. Max’s logo, considered in its first order of reference, is simply that a certain visual entity happens to symbolically refer to Max. When it is applied as a marking on Max’s bowl it can, in a sense, claim for Max the bowl’s use.<sup>4</sup>

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<sup>4</sup> The actual marking of the bowl by the attachment of the logo onto it is an indexical function, but the attachment of the logo is not the design of the logo. This distinction will become important later.

Second order reference has to do with the manner in which the materiality of the sign vehicle (i.e., in our specific case, “the design of the logo”) produces whatever polysemy it does, including, but not limited to, whether these additional polysemous factors aid or impede, or are neutral to, the establishment of first order reference. Second order reference constitutes the play of sign action a visual entity engenders by being materially the way it is, regardless of whether the design happens to aid or impede the logo’s ability to adequately identify the host.

This distinction is critical. So that it is clear, let’s take the example of a well-known brand: Starbucks Coffee. Recognizing the logo to identify the coffee retailer known as Starbucks is first order reference. The logo is symbolic in its first order reference since the relationship that is established between the referent (the coffee company) and the sign (the logo as a visual entity) is one of consensual agreement within our culture, reinforced through habit and repeated exposure to products and advertising. Recognizing a mermaid in the Starbucks logo is a reference of second order. What a mermaid has to do with coffee is certainly a baffling question,<sup>5</sup> but whether or not it is an intelligent choice, recognizing the form as a mermaid is a case of iconicity operating within second order reference. Second order reference includes all those denotative and connotative references that, although usually intended to be relevant and supportive to the function of identification, are not strictly the attaining of that identification proper.

Considered as master artwork – rather than, say, a token instance of the attachment of the logo onto a dog’s bowl – a logo in first order reference is always purely symbolic: a visual entity is specified and agreed upon to stand for an organization. This consensual agreement is even codified in law with the registering of trademarks which display the proper visual entities and their prescribed hosts (Beebe 2004). Even were a logo to consist of a faithfully rendered organizational diagram of a company’s management structure, that logo, in its first order reference, acts symbolically. The iconicity of the diagram to the organization’s management structure operates as second order reference.

In semiotic analysis of logo design and identity systems, it is actually second order reference that is usually the focus, both in the process of designing and later in studying their status in material culture. The influential work of Jean-Marie Floch (2000 [1995]), for example, dealt exclusively with analysis of second order reference. The branding specialist Dan Stewart once said that he could take any random thing, even a mud splatter, and adapt it quite happily to identify any company – as long as

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<sup>5</sup> The name Starbuck (from *Moby Dick*) and the mermaid were selected because the founders wanted to allude to Portland Oregon’s historical ties to the seafaring. This idiosyncratic backstory is lost in all subsequent branding, and it proves to be irrelevant to making successful first order identification once the logo is retained in memory.

identity alone (first order reference) were all that was required.<sup>6</sup> But in practice, Starbucks and Dan Stewart aside, it is usually beneficial that second order reference support the work of first order. In most cases, the central challenge for designers is to develop second order reference that aids first order identification.

So now to return to Max's scratch-mark logo. The "this-identifies-Max" is its first order reference. Second order reference is found in the scratch mark which alludes to Max's favorite activity. This is primarily an indexical relation: you can almost feel the gestural movement of Max's claws scraping the ground.

But if Max's logo is indexical in its second order, is there not also an iconic element there? The logo constitutes a kind of portrayal, a representation, of that gesture. It re-presents; it certainly is not the original gesture itself, not the divots in the earth. In depicting the scrape, it refers iconically to the clawed ground near the fence. As it exists in the logo, that representation of the scratch marks is a result of a long series of mediations. It has been mediated through photography, drawing, Photoshop, and other programs and art techniques. It has also been further mediated, as you see it displayed in the figure, by being printed in black ink through the offset lithography process onto paper. Or, if you are reading this electronically, it has been mediated digitally to display as pixels on a screen. There is more here to be unpacked.

The key is to consider how what we see is seldom *un*-mediated. Think of the process of design. The logo, once finalized after being developed through the various artistic techniques, exists as an "archetype." The archetype is the settled source art, or "master"—the parent to all particular uses. The archetype (these days)<sup>7</sup> actually exists not so much as a visual entity but as a virtual visual, a replicable string of digital code in a hard drive or server. That archetypal master, when deployed, produces replicant visual entities – displays of the logo on screens, paper, signage and so on. Each of these appearances of the logo out in the world is a "token" (CP: 4.537).

All of these kinds of representation, in which the focus is on how something is carried from master to token or taken from one state and represented through another – from Max's actual scratch to the depiction of the scratch, from archetypal master logo to token display of it – constitutes a third order of reference. When it purports to record, authenticate, to document, or to exemplify its source, third order

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<sup>6</sup> Dan Stewart in an informal conversation with the author at the offices of Stewart-Winner Design, about 1988.

<sup>7</sup> When design was analog, this sequence of archetype to token was more complex. The refined design of the logo as produced after many sketches, was the archetype, but it had to be re-drawn very large as master art called the prototype (or master). Then the logo had to be carefully reproduced in many sizes, the pages of which were called "slicks." These pages of smaller reproductions of the prototype were isotypes. Finally, upon public display through print or on screen one once again arrived at the token (Skaggs 1994: 30).

reference is usually iconic, in that the token is resembling the archetype. When it involves significant transformations – when the evolving visual entity progresses through a chain of iterative states as it is developed, it can reference process, action, manipulation of itself, and in doing so, it is indexical in its third order. So, for example, when the mark is made into a high contrast black and white image, the reference back to a photographic image (and from photo documentation of the original) is an example of third order reference. Third order reference concerns media theory, as developed at least from the 1960s (McLuhan 1994 [1964]). Third order reference is self-referential in the sense that it alludes to the narrative, to the memory, recounts the visual entity's development and life in the world.

There's another way in which third order reference can have an important indexical function, one that is especially apparent in branding. The imprinting of the token logo on *this* box, *this* product, *this* dog bowl, refers indexically to who sold this, who manufactured this, or to whom this belongs. First order and third order share a kind of kinship: if first order reference deals with the “brute fact” of connection of master to host, third order has to do with each transformed or embodied or enacted occurrence as it is marked into existence. Standing apart from both of them, second order, on the other hand, has to do with imagination and stories: all the denotative information as well as all the connotative allusions that are represented in the design as material artwork. Second order is conspicuous. We are often aware of the content conveyed in second order, but only dimly aware of the parallel operations of first and third orders. As they have been so thoroughly absorbed into the fabric of our hyper-mediated world, first and third order reference is usually subliminal, invisible, hidden, taken for granted. They carry the authority of truth (even though, as in pirated Rolexes, they may lie).<sup>8</sup>

The orders of reference may be shorthand like this (where  $Ve$  stands for the visual entity):

- 1st Order:  $Ve \rightarrow \text{Host}$
- 2nd Order:  $Ve \rightarrow x, y, z \dots$
- 3rd Order:  $Ve_1, Ve_2, Ve_3, Ve_4 \rightarrow Ve$

### 2.3 Mode variance within second order reference in visual semiotics

Having distinguished these three orders of reference, the following discussion will take place within the context of second order reference, the order that investigates what a design says, the story it tells, as an archetypal master. Our discussion will

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<sup>8</sup> If, as Eco has famously stated, semiotics is the study of “everything which can be used in order to lie” then perhaps third order reference is the study of everything that can be used to lie more easily.

stay at the meta level however, because what we are investigating is not a particular story so much as it is looking at the means by which these stories are imparted.

Returning to Max's logo. When we left off with Figure 2b, we had made a logo that used a high contrast form of Max's gestural scratching movement. Now we continue our design thinking. Perhaps the rugged scratch could be presented against a smooth black disk which would have the effect of contrasting the impulsive straight lines of the gesture against the coolly rational curve of the circle (Figure 3a). In making that move, it suddenly occurs to me that by eliminating one of the scratch marks, I begin to see the letter M. The letter M, being alphabetical and therefore inherently part of a verbal code, is acting symbolically. Here, I'm confronted with some choices. I could forefront the "scratch evidence" in the design, thereby highlighting its indexicality. Or, I could make it a bit more recognizable as an M, in which case it emphasizes the symbolic code of a letter of the alphabet (Figure 3b). The latter choice moves us quite far from Max's original gestural paw mark.

But here is a crucial point: Notice that in making these choices, I am not simply toggling back and forth between a pure index and a pure symbol, but rather I am moving along a spectrum with many degrees of freedom. I can choose an iteration that is right in the middle, between being a letter of the alphabet and a gestural scratch mark. Here, still working within second order reference, index and symbol are blended. Finally, perhaps I realize I may attain the best of both worlds if I don't force the paw scratch mark to "become" an M but instead simply suggest M-ness by adding the rest of Max's name in typography so that verbal context provides hints (Figure 3c). Now, not only is an emblem blending gesture and word (index and symbol), but I now have a very gestural index and a very verbal symbol sharing space within a geometric circular element in which the disk is neither distinctly indexical nor symbolic!

So we see the fugitive nature of the icon/index/symbol class distinction when applied to visual design. But in this simple design considered only in its second



**Figure 3:** The compositional interactions of the claw mark graphic with graphic elements such as a black disk or typography greatly influence how the visual entity as a whole is interpreted, as well as whether the elements are functioning as icon, index, or symbol.



order of reference, it is already becoming practically meaningless to speak of the logo as being iconic *or* indexic *or* symbolic. It is simultaneously all three and to various degrees. Neither is it that something is iconic in first order reference and indexic in second; on the contrary, a single gestalt visual entity operating within a single order of reference (second order in this case) contains nested components that touch base on all three modes of relation. This “semantic mode variance” is a problem that needs to be confronted if the second trichotomy – one of Peirce’s keystone concepts – is to have appreciable practical employment in visual semiotics.<sup>9</sup>

## 3 Visualizing the visual gamut as a model of mode interaction

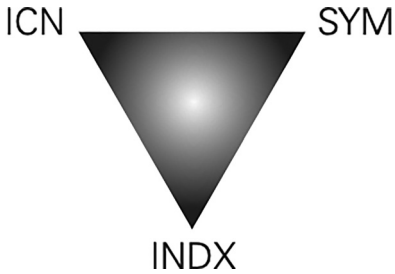
### 3.1 The gamut as a model for mode variance

Essentially, the visual gamut as originally proposed (Skaggs 2017) is a way to model semantic mode variance. As we have so far constructed it, the gamut is a field of semantic conceptual interactions, a map of the diverse territory within which iconicity, indexicality and symbolicity interact. Instead of being discrete and mutually exclusionary states of reference, icon, index and symbol can be thought of as forming three apexes defining a semantic conceptual triangular plane with various mixtures (Figure 4). Only at the three apexes do icon, index and symbol function in a “pure” sense. Within the rest of the triangular field, they blend to various degrees. Just as you might mix the three primary colors upon a palette, so these three primary relational functions may be mixed in visual entities.

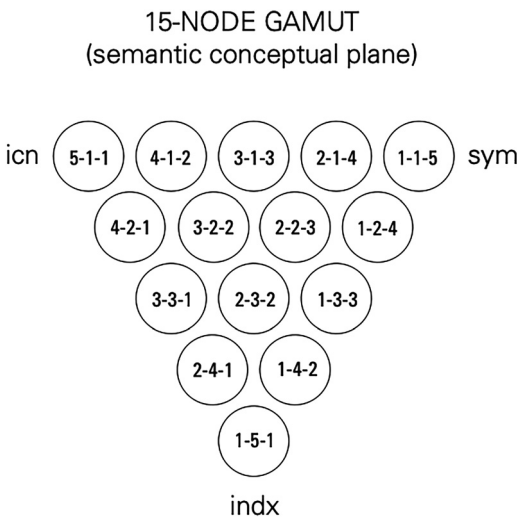
Within the gamut’s field, any departure from the apexes of icon, index and symbol represents a certain kind of abstraction. This is not really the kind of abstraction that we will soon be taking up, one that involves a simplification or reduction of visual detail, but rather a sort of *semantic abstraction*. It is a “blurring” of the semantic conceptual clarity of sign-referent relation found at the apexes.

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<sup>9</sup> We must make note of another detail: there are two different kinds of node variance going on so far in our discussion of Max’s logo. We have already seen examples of both: one is the kind of variance that occurs when a single (simple) visual entity is indeterminate, blending aspects of iconicity, indexicality and symbolicity. The other kind of node variance, such as occurs in the last of the Max logo iterations, is when a compound or complex visual entity contains sub-elements that separately occupy clearly different areas of the gamut. In the case of a compound or complex visual entity, in which various sub-parts of occupy different regions of the gamut, either each location can be mapped on a single gamut, or each sub part can be located on its own gamut.



**Figure 4:** Semantic abstraction can be thought of as a kind of merging or blurring of the discrete notions of iconicity, indexicality and symbolicity.



**Figure 5:** “Calibrating” semantic abstraction by using a five-fold division of each edge (icon-index; index-symbol; symbol-icon) produces a semantic surface of fifteen nodes which can then be labeled with reference numbers.

Semantic abstraction is a rhetorical device in which the simultaneous engagement of two or three modes of reference captures attention, elicits connotations, engages the interpretative system (Figure 5). Semantic abstraction calls attention to the materiality of the sign, and in that sense fulfills Jakobson’s (1960) definition of the poetic function or what Eco terms the aesthetic (Eco 1976: 261–275).

### 3.2 A way of calibrating

It would be helpful if there were some way to estimate and calibrate these mixtures of the three semantic conceptual nodes. We need to be pragmatic in deciding how finely to calibrate and measure. In deciding the question, a division into too many

cells will make the tool cumbersome and imply a precision that may be illusory, while too few divisions – two-fold, or into thirds – will make the gamut less helpful as a tool of analysis.

A division of each spectrum into fifths, seems a fine compromise. Figure 5 shows the gamut’s semantic conceptual plane divided into fifteen cells, or nodes, based on such a five-part scheme.

The labeling convention for this semantic conceptual plane is simply to ascribe the order ICN-INDX-SYM where the highest value is 5 and the lowest is 1. So, for example, a pure iconic relation at the apex is ICN(5)-INDX(1)-SYM(1), which can be abbreviated 5–1-1.

This 15-node gamut semantic conceptual plane suggests interesting “species” of semantic behavior (Figure 6). The unblended apexes (Figure 6a) represent the three most extreme nodes. There are three dyadic blend groups in which there is a mix of two of the modes of relation, but the third is not a factor. Icon-index dyadic blends occupy the left edge (Figure 6b); index-symbol dyadic blends appear along the right edge (Figure 6c); the three symbol-icon dyadic blends are along the top of the triangle (Figure 6d). Finally, the triadic blend group, in which iconicity, indexicality, and symbolicity are all involved, occupy the interior of the triangle (Figure 6e).



Figure 6a: Unblended apexes.



Figure 6b: Icon-index dyadic blend group.



**Figure 6c:** Index-symbol dyadic blend group.



**Figure 6d:** Symbol-icon dyadic blend group.



**Figure 6e:** Icon-index-symbol tertiary blend group.

Using a 15-node gamut allows easy categorization of visual entities within the semantic conceptual plane, and the precision is unlikely to be heavily debated while still allowing for clear differentiation of positions by various entities. An analyst using this tool would begin by describing the chosen visual entity and then locating it on this semantic conceptual surface according to its operating sign-referent relations.

The gamut, as it has been elaborated so far, is concerned with conceptual semantics. Indeed, by mapping the territory covered by a sign's connection to its referent we are, in essence, precisely specifying exactly that class of investigation that Charles Morris properly called *semantics* (Morris 1971: 21–22).

But now we will expand the visual gamut to include the first of Morris's classes, *syntactics*, where analytic attention is placed on the material complexity of the sign itself, rather than on the sign-referent relation as in semantics (Morris 1971: 20). For our present purposes, visual syntax has to do with the form and composition of the visual entity. We especially want to look at what happens when we decide to simplify the syntax, to make it more abstract.

## 4 What abstraction is

### 4.1 Abstraction of form

We have already used the term semantic abstraction to refer to the movement away from the three apexes of the semantic conceptual plane. But now we will discuss how abstraction relates to questions of form: syntactic abstraction.

In the world of fine art, the term “abstract” is applied to work in which representational or figurative images are greatly reduced in detail and in which form is emphasized at the expense of “fidelity” to a subject. The Tate Gallery in London defines abstraction: “Abstract art is art that does not attempt to represent an accurate depiction of a visual reality but instead use shapes, colors, forms and gestural marks to achieve its effect.”<sup>10</sup>

Although in a strict philosophical sense, the Tate's definition suffers from some ambiguity, it is a pretty good approximation of the way the term “abstract” is used in the art world. Using our vocabulary, it says that anything that reduces iconicity increases abstraction. With the visual gamut as a background, let's look at how this notion of abstraction relates to a specific artwork.

A frequently mentioned example of abstract art is Charles Demuth's early 20th century work, “I Saw the Figure Five in Gold” painted in 1928 (Metropolitan Museum of Art, NY). In the painting, a figure “5” is repeated three times, growing concentrically larger, against a bright red background which is itself pierced by radiating lines of gray and deeper or lighter values of red and gold.

There are certainly aspects of the painting that can only be described as geometric “shapes, colors or forms,” but the conspicuous typographic numerical elements are semantically much more than that: they are visual symbols that provide specific linguistic content. Here is a painting that is held up as an exemplar of abstract art in the sense that it is non-representational; yet, unlike say, Vasarely's “op art” or Rothko's color fields, it is nevertheless extremely denotative in one sense:

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<sup>10</sup> Tate Gallery web site: <https://www.tate.org.uk/art/art-terms/a/abstract-art> (accessed 16 June 2020).

specifying a particular term, a remarkably legible mathematical sign. Although the painting reduces the iconicity of a subject such as a fire engine, it is not at all reduced in its symbolic reference to the numerical content of fiveness. We cannot say (unless we read the backstory) what it is the fifth of, or what the five means in the context of the other painted forms, but we have just as clear a denotation of the numeral 5 here as we have of, say, Lisa Gherardini in Leonardo's *Mona Lisa*.

Having held the visual gamut in the back of our mind, we now can ask the question: Why should abstraction be limited only to the distancing from the iconicity of the image? Couldn't – and shouldn't – the term be better applied to any departure from the three modal apexes of the visual gamut? This would mean that abstraction would refer to those visual entities that depart not only from the iconicity of the detailed representational image, but also from the clearly indexical gestural mark and the very legible word. We have just described this case in what we have called “semantic abstraction.”

If this broader scope is adopted, then abstraction would not be based on whether something iconically resembled some possible object in the world, but rather would indicate the removal of a certain fullness or definitiveness of conceptual semantic content. It would imply a weakening of the sign/referent modal link, and in doing so, likely a softening of the specificity of sign. In other words, abstraction would entail the depletion of denotation. To what degree this depletion is effected is of interest to the semiotician, but denotative depletion to any significant degree leaves other semiotic elements more exposed: materiality, graphic form, expression, and connotation.

And this is precisely what our experience of abstract art is like. Facing a work of abstract art, it is just when we don't know what it is that we begin to really notice how it is – in its texture, its colors, its formal proportions, its sense of rhythm and so on. With abstraction, we notice form itself rise into our awareness, and by so doing we are enticed to feel expression and to be aware of associative connotations. Reducing conceptual denotation emphasizes syntax. And reducing syntactical detail may reduce denotation. But this is something that we need to explore further.

## 5 Completing the visual gamut

### 5.1 Adding the syntactical abstraction axis

Although it only addresses the departure from full iconicity, the classical notion of abstraction represented by the Tate's description does usefully suggest the process of simplification, as a form is reduced to its elemental syntactical structures:

“shapes, forms, and colors.” This becomes the lynch pin for enhancing the visual gamut by adding a syntactical dimension.

Syntax necessarily ushers in the rather thorny problem of visual complexity. Although attempts have been made to quantify complexity through non-subjective means (Johannessen 2017), we prefer to take an approach that admits the vital importance of gestalt principles; therefore when we speak of the degree of complexity or simplicity here we allow the eye to make a naive perceptual assessment.

Think of formal, or syntactic, complexity as a vertical spectrum ranging from the greatest possible complexity<sup>11</sup> at the top down to the simplest possible visual entity at bottom. While we don't have a name, or even a way of imagining, what lies at the top of this spectrum (as the most complex possible visual entity), we do actually have a name for the single form that occupies the lowest position: we call it a dot (or disk). A dot is a solid circle. It has the minimum possible formal complexity because any modification made to it can only disrupt its simplicity and result in a more complex form. The other end of the spectrum – the maximally complex end – is, in a sense, unlimited. Theoretically, it represents the most complex of all possible objects, such that any modification made to it must always result in a simpler form.

To make a painting more abstract, subtract detail, make the form simpler, reduce it to its fundamentals. This process eventually arrives at so-called “non-objective” painting, where the subject is completely unrecognizable. But while, in practice, abstraction usually involves simplification of form, simplicity alone is not what we mean by abstraction. Abstraction implies the movement *away from something*, a filtering process in which there is an implied starting state that is winnowed, achieving a state that is much simpler than it. That is, the concept of abstraction carries within it the ghost of an ancestral, more complex, visual entity. Yes, syntactic abstraction is the taking away of complexity, but from an assumed and unstated *normative state of greater complexity*.

Ultimately, it is this assumed normative state of greater complexity that entwines syntax with semantics. In the case of abstracting an image, for instance, the former state is, in a sense, never left completely behind. The visual gamut as we have presented it, as a 2-D surface representing conceptual semantic interactions, proves insufficient to illustrate what happens when the sign/referent connection is affected by a shift in formal complexity. We have noted the semantic abstraction that occurs

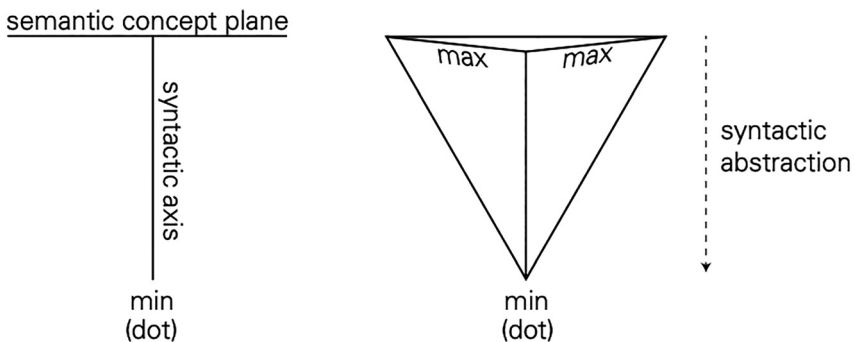
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<sup>11</sup> The opinion of what constitutes visual complexity is not as settled as this remark suggests. Some have divided complexity into classes including perceived, objective, emotional and social. For the limited purpose of this discussion, however, it is sufficient to simply regard the complex entity as being one visually comprised “of many parts” and the visually simplest entity as one “of a single part.”

when moving away from the apexes, but now we need to add a dimension that charts the kind of abstraction that happens from syntactic formal simplification.

The incorporation of syntax into the gamut is made in two steps. The first step is to bring the 2-D semantic conceptual plane of the gamut into connection with this other, syntactical dimension. Imagined as seen on-edge (Figure 7a), the 2-D triangular surface appearing as a line representing the semantic conceptual plane is now intersected by this strictly form-based, syntactical abstractive axis. The syntactic axis moves from a position of great complexity up at its junction with the semantic conceptual plane, downward (signifying reduced complexity as it goes) until reaching its minimum condition, the dot. The second step is to fully develop the articulation so that it can show all the interactions of possibilities. This is done by adding surfaces that run from the minimum syntactic form (i.e., the dot) upward to join the edges of the semantic conceptual plane (Figure 7b).<sup>12</sup>

The new model that emerges is a three-dimensional tetrahedral form, the top surface of which is the original triangular gamut, the semantic conceptual plane. The other three sides complete the tetrahedron. This “enhanced visual gamut” now incorporates the full possible effects of syntax on semantics. It’s volume envelopes all the blended positions that can occur – not only the blending of nodes within the semantic conceptual plane – but also the blending effects of syntactic abstraction as a visual form is reduced in complexity and made more minimal. This new visual gamut is able to illustrate syntactical and semantic entwinement: there is never a shift in form without a shift in meaning.



**Figure 7:** The syntactic axis runs perpendicularly to the semantic plane and terminates in the minimal visual form: a point, or “dot”.

<sup>12</sup> The semantic conceptual plane is shown in the figure with a slight “tilt” so it is easier to see the figure as a 3D form.



## 5.2 A problem in the flight test: semantic and syntactic mutual influence

Having this improved model in hand allows us to test it, make some observations, and see how it holds up. We can imagine a designer experimenting with various abstracted iterations of some graphic device. Viewed from a top view projection, looking downward through the semantic conceptual plane, as the syntax is increasingly abstracted (moving ever-downward toward greater simplicity), the model predicts that the localization of the design as plotted into the model tends to move inward toward the center, away from the fullness of the icon, indexical, or symbolic apexes. This is due to the subtraction of information which moves toward the minimum limit of the dot, and the dot would not be clearly inclined toward icon, index and symbol, remaining equally wanting of any of them. It suggests that complex forms tend to be more capable of fitting into apexes of the semantic conceptual plane, and that it is not possible for near-fully iconic, indexic or symbolic<sup>13</sup> visual entities to be minimal structures, located down near the bottom of the syntactical axis. It predicts that simpler forms must lead to ambiguity in terms of their sign/referent relation.

But this is not what we observe. Consider a word set in two typefaces, one elaborate and one simple (Figure 8). Here, the predicted results are inverted, with the simple typeface actually being much more legible (i.e., maximally denotative in the symbolic mode) than the elaborate font. In this case, it is simplicity that leads to clearer denotative symbolicity. The verbal language that is symbolized by the alphabetical glyphs is better served by the stripped-down, than by the complex, form. A sign/referent relation that is symbolic is greatly aided here by a reduction of formal detail. Something must be wrong with the model.

Let's go back and think about what is implied when we show these surfaces of the tetrahedron moving upward from the minimum syntactical condition (the dot) toward the semantic conceptual plane, before terminating there at an edge. Since



Tree Tree

**Figure 8:** If reducing formal complexity always led to reduced semantic clarity, we would expect the more complex typography to read more legibly than a simple typographic form. But that is not what we find. Instead, the semantic conceptual plane represents the region of syntactical form in which a visual entity attains its most replete capacity to deliver denotative semantic content.

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<sup>13</sup> Recall that we are speaking of second-order reference. It certainly is possible for a form in any degree of complexity to function as a symbol in 1st order reference.

there really is no such thing as a maximally complex visual form, this upper region, which we began by considering only in terms of its degree of complexity along the syntactical axis, must be better defined. Once we realize that the edge is determined not only by the syntactical axis but is also shared by the semantic conceptual plane, we understand that these three new tetrahedral faces of the gamut cannot be completely divorced from the semantic. In the enhanced combinatorial gamut, syntax and semantics are both implicated everywhere. What began conceptually as two quite separate operations, semantics and syntactics, are now seen as an arena of mutually influential forces.<sup>14</sup>

Increasing abstraction by moving down the syntactic axis does indeed emphasize form, nevertheless semantic reference is never completely abandoned. Sliding down the edges of the tetrahedron toward the nether regions near the minimum condition of the dot, although having departed from “full” semantic clarity, there remain tendencies toward iconicity, or indexicality, or symbolicity.<sup>15</sup> Indeed, were it not so, one would not see Andy Warhol’s series of serigraphs as greatly abstracted Marilyn Monroe portraits, which, despite their lack of detail, can yet be recognized as pertaining to the actress Marilyn Monroe.

If the top surface of the gamut is not representing some state of maximum visual complexity, then what does it represent? It must allow for not only syntactical complexity of a high order but also the simultaneous clean expression of sign-referent relations. This entails that the conceptual semantic plane must do two jobs. It represents the most complete syntactic form that also yields the most clearly specific semantic (sign-referent) relation possible. Put another way, it defines *the sign’s greatest formal complexity that engenders the clearest denotative connection with its referent*. It is the condition with the maximum possible clarity, the fullest specificity, the greatest convergent reference. For any relation of sign to referent, where reference is denotative, this plane maps those visual entities that capture the reference in the most complete way. This is the region in which – through combinations of iconicity, indexicality and symbolicity – visual entities attain their fullest, most replete, capacity to deliver clear and direct semantic content.

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**14** A side implication of this is that Charles Morris’s division of semiotics into three discrete branches would seem to be seriously undermined. It is not possible to study syntax without also studying semantics, an admonition that probably also extends to pragmatics.

**15** One might object that even at the end condition of the dot a certain degree of symbolicity predominates, and perhaps offer the example of the period at the end of this sentence as an example. However, the period, removed from its context as a part of a sentence, loses its symbolic tendency and could just as easily be a ball (icon) or a puncture (index). So only changing the semiotic moment (i.e., the changing framing of the analytic subject) can move the dot significantly from its “impartial” position of total indeterminacy.

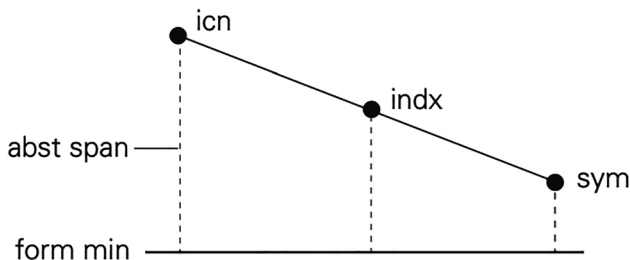
For a photograph taken for my passport, I seek the most iconic likeness possible. I want the highest possible resolution, the color to be accurate, the image to be sharply in focus. Although it is possible for me to take other kinds of photographs, or even submit a drawing, these materials would likely be unacceptable to the authorities because they are looking for maximum fidelity (resemblance) when comparing the image and me when I step up to the customs booth. So the iconic apex of this plane marks the node where the clear association based on resemblance is most unmistakable; for an index, the indexical apex is the place of greatest mark or trace specificity; for a symbol, the most legible territory for the symbolic code to function.

In the semantic conceptual plane, even where, as we have described, we already find semantic abstractions of a dyadic or triadic modal blend, that blend is in its most developed denotative state. Although the denotative clarity may be reduced from what it would be at one of the mode apexes, it is yet as clear as can be attained, with all the complexity of form needed to assure that connection occurs.

### 5.3 The abstraction span is smaller for symbols

In our evolving model so far, we have envisioned our tetrahedron as a regular polygon. But it is now necessary to make certain corrections. This is because symbols, and to some degree indexes, function at their highest denotative levels when they are forms that are already simplified. For example, returning to Figure 8, the word “Tree” is most highly legible (i.e., its fullest denotative state) when set in a simple font, not in the more complex font which slows reading, and hinders that legibility. Not only is the more complex font less clear, but in its “surplus complexity” it begins to acquire gestural elements, features which push it toward the indexical apex. So we must revise our model to reflect this.

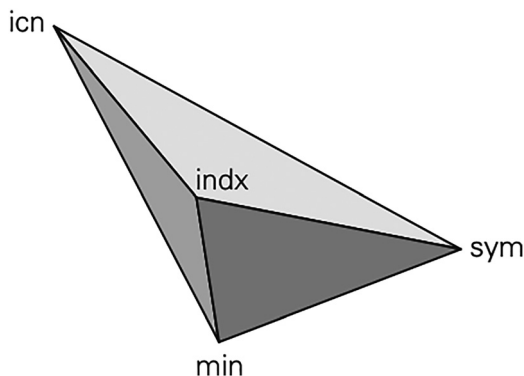
If one looked at the semantic conceptual plane from the edge-on view (Figure 9), and measured the distance from that formally complex but highly representational



**Figure 9:** Abstraction spans: The distance between a denotatively replete icon and the formal minim (a dot) is greater than the distance between a denotatively replete symbol and the minim. Indexes occupy an intermediate distance.

semantic state to the most abstracted possible condition – the minimum condition of the dot – the potential span of variation in formal complexity between the icon apex and this syntactical minimum is large. This span is the abstraction span, the amount of latitude that one can have in choosing a degree of simplicity. Meanwhile, following the discussion above, the distance between full symbolic notations, which function best when already reduced in complexity, to that minimum formal condition is smaller (Index would seem to occupy a place in between). The abstraction spans for iconicity, indexicality and symbolicity are different. What this implies is that in making a symbolic connection with a referent, a visual entity can almost always benefit from reduction in formal complexity, while for an iconic connection, great formal complexity contributes toward fidelity and likeness. Indeed, while a high resolution image always makes for better resemblance, for a symbol, any increase in formal complexity beyond some efficient, coded, basic requirement will inevitably move to a location on the semantic conceptual plane that is not further upward toward the symbol apex (there is no higher position than what is already semantically replete) but over, toward a dyadic blending or a triadic blending with both iconic and indexic modes. Notice that the intricate typography in Figure 8 calls your attention to a kind of gesture, to drawing, not to the symbolic but to the indexical.

Our model therefore cannot be a regular tetrahedron with four equal sides, but rather one with a much higher span at the iconic apex and a declining semantic conceptual surface that descends to a quite low span at the symbolic apex (Figure 10). In second order reference, probably as part of the process of becoming consensually habituated, symbols undergo a truncation of formal complexity and become a kind of notation. The notational code, that which links the simple forms of the notation to the referent's content, is agreed-upon, consensual, arbitrary – definitional of symbolicity. This is so in written language, but also in any other form of communication within a technical community that has use for repeated



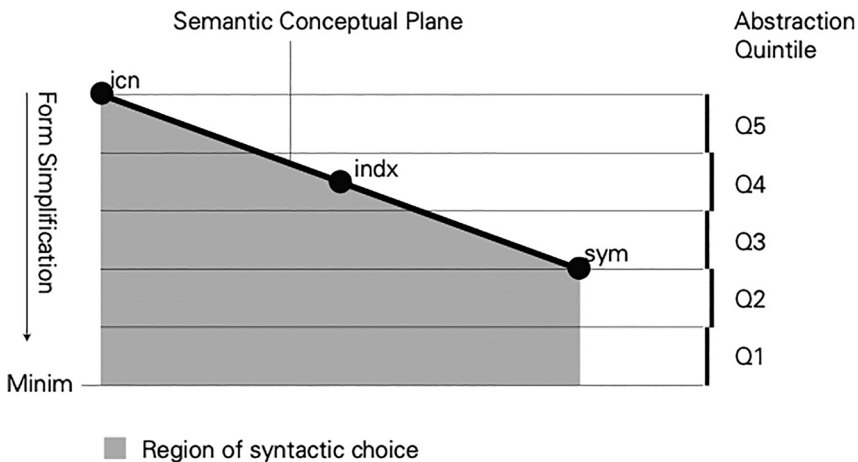
**Figure 10:** A 3-D model of the enhanced visual gamut is a tetrahedron with a sloping top surface such that the edge from icon to minim is longest, the edge from symbol to minim is shortest, and edge from index to minim is of intermediate length.

packets of information such as electricians, mathematicians, choreographers, music composers, surveyors, chemists, etc. Indeed, it may well be this ability to truncate to code that played an important role in *sapien's* evolution toward language and writing (Haworth and Prewitt 2020).

## 6 Calibrating the nodal locales within the enhanced visual gamut

### 6.1 Abstraction quintiles

We have discussed how the blending of the semantic conceptual plane can be calibrated using a 15-node system. Now we need to add a calibration mechanism for syntactic abstraction. The key to doing this is to realize that the degree of syntactical abstraction differs as one moves around the semantic conceptual surface. The simplest way to do this is shown in Figure 11. Here, the inclined semantic conceptual plane, exhibiting the simplification of form that occurs as one moves from iconicity to symbolicity, intersects five levels of formal complexity. The five quintiles represent levels of formal detail, but as the semantic conceptual plane descends toward symbolicity, the actual “available” detail that can functionally contribute to clarity and specificity of the semantics is reduced. The most complex of these quintiles includes the pure icon, where all five quintiles are possible, while the symbol only includes quintiles 1 and 2. What this is showing is that, within second order reference,



**Figure 11:** As a way of describing or profiling the syntactic abstraction of visual entities, it is helpful to take a five-part scale. Because icons have the largest abstraction span, they have the potential to inhabit any of the five quintile slices. Symbols inhabit two potential slices, and indexes three or four.

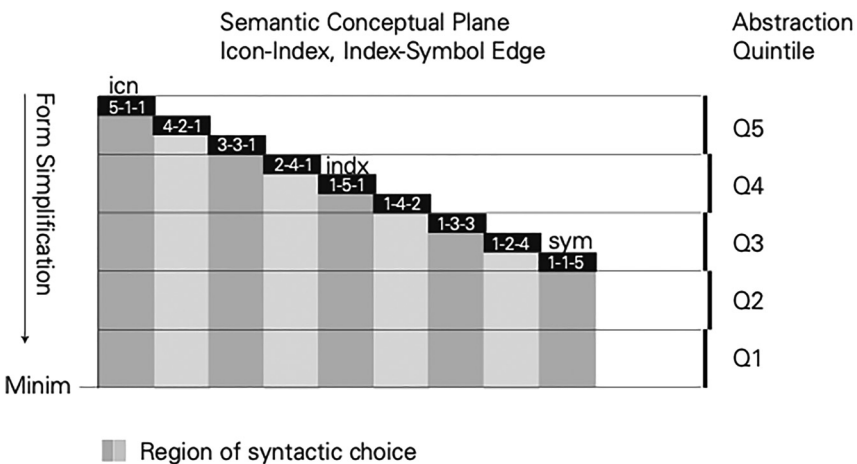
symbols allow for fewer degrees of complexity before additional detail impairs rather than strengthens denotation, whereas the more detail an icon possesses, the more it denotes its subject. It also illustrates how it is possible to greatly abstract a pictorial image and still bear some likeness, still have it be recognizable as its subject.

But the division into quintiles doesn't quite give us a completely useable nomenclature as it still fails to link the discrete fifteen nodes of the semantic conceptual plane with the quintiles. That is remedied in Figures 12 and 13a and b, in which the inclined semantic conceptual plane is shown broken into its fifteen nodes. Figure 12 shows the semantic conceptual plane, viewed from the icon/index/symbol side, and "flattened" so that two edges appear as one line. One edge runs from icon to index and the second from index to symbol. The figure then shows the region of available syntactic choice in terms of potential complexity for each of the nodes. Notice that under symbol there are only two quintiles of choice (reflecting the relative simplification of form that happens with symbols).

The edge that runs from icon to symbol is shown in Figure 13a, and the interior, tertiary blend group are illustrated in Figure 13b.

## 6.2 Full notation of the enhanced gamut

The protocol to notate these conditions is ICN-INDX-SYM/QUINT. So, for example, a pure symbol within the semantic conceptual plane (notated 1-1-5), if it happens to be extremely abstract, would be notated 1-1-5/Q1. A very detailed purely iconic



**Figure 12:** The enhanced gamut with the demarcations of form simplification in place can be combined with the nodes of the conceptual semantic plane to offer an extremely precise profile for any visual entity.

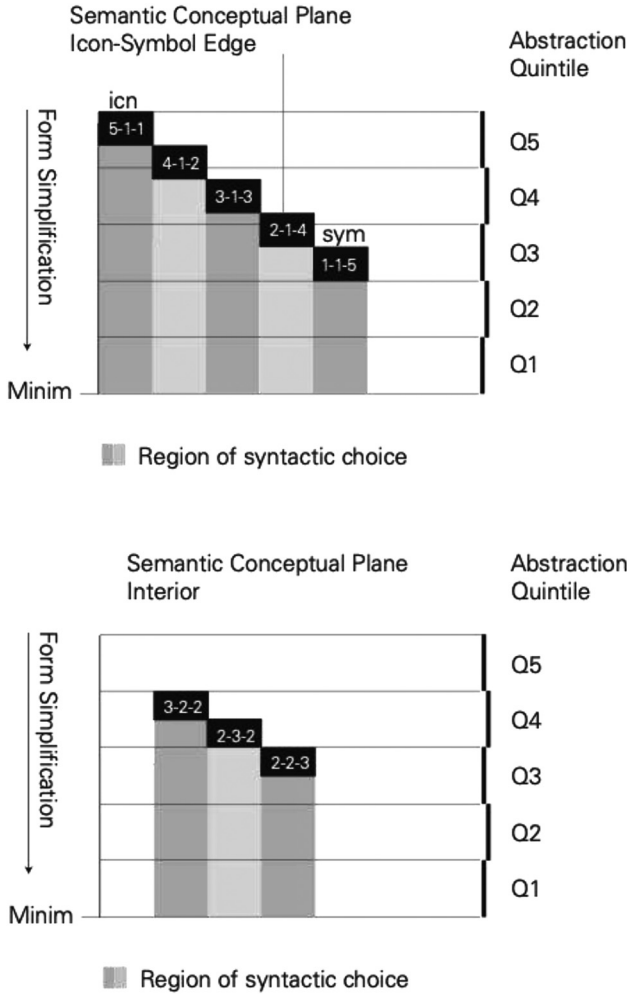


Figure 13: Enhanced gamut syntax quintile references for icon-symbol edge and semantic conceptual plane interior nodes.

design would be 5-1-1/Q5. Warhol’s Marilyn Monroe serigraphs, quite iconic and also nodding slightly toward symbolicity, and in which a considerable amount of detail has been removed so that they are quite abstract, would be perhaps 4-1-2/Q2. A form notated 2-3-2/Q4 would represent a tertiary semantic blend that is syntactically fairly complex.

In Max’s final logo, elements of symbolicity and indexicality predominate. The black disk, if it were to be considered as an element by itself would occupy the very

bottom of the extended gamut; as a dot it is the simplest of forms. But when we look at the grouping of the logo as a whole, as a gestalt consisting of several elements, the simplicity of the disk is tempered by the detail of the scratch mark, and to some extent by the forms of the alphabetical glyphs in his name. As a whole, its position on the semantic conceptual plane is approximately a 1–3-3. 1–3-3 has three possible quintiles: Q1, Q2, Q3. It is a fairly simple logo on the whole. I would probably type it as 1–3-3/Q2.

Ultimately, it is less crucial to agree on the precision of the typing on the gamut than it is to see how the visual elements do their work of relating to their referents, and to see how abstraction, both semantic and syntactic influences this process. But although two analysts may disagree over this or that particular slot, there will probably not be complete disagreement. The disagreements may prove to be more enlightening anyway.

## 7 Conclusion

This article argues that the Peircean second trichotomy can be adapted to play a greater role in the analysis of visual entities. A visual gamut, first proposed in 2017, maps the combinations of iconicity, indexicality, and symbolicity within the conceptual semantics of visual signs. Now, the gamut is developed further so that the semantic conceptual plane can be combined with the effect that syntactical abstraction has on semantics. This full visual gamut is a 3-D mapping of the ways in which visual entities function in terms of their sign-referent relations and their formal complexity. The model, an irregular tetrahedron, predicts and reflects several facts: that any change in formal complexity results in a change in semantics; that icons allow for a greater range, or abstraction span, in visual detail than do indexes and symbols; any move away from pure iconicity, pure indexicality, or pure symbolicity is a move toward abstraction; that there are two kinds of abstraction – semantic and syntactic. Finally, a calibration system has been proposed by which visual entities can be described and “typed” with an approximate degree of precision.

The purpose of constructing a model of sign-referent relations combined with syntactic, formal properties is two-fold. First is simply to provide a better rubric for describing the “messy” ways visual entities operate within Peirce’s second trichotomy of the structure of signs. Second, is to develop a calibrated way for semiotic analysts to contrast and compare visual entities in terms of how they employ strategies within the second trichotomy.

One imagines it may be possible, using this model, to investigate ways different cultures, in different situations, or in different time periods, or for



different purposes, use various regions within the gamut. Perhaps various sectors of the gamut begin to take on habituated connections within the communicative practices of different groups of people or different circumstances. If that happens, then nodes within the gamut would themselves become hyper-symbols, operating in an even more meta way, backgrounded under cultural norms. But developing these issues is work that lies outside the parameters of the present study.

This article has emphasized second order reference, although there may be similar dynamics occurring in the first and third orders as well. Logo design was the locus of the elaboration of these ideas because logos are somewhat straightforward and compact in their purpose and discourse. Nevertheless, the concept of the visual gamut can be used for more intricate systems of graphic communication. Furthermore, while this work is focused on visual semiotics, it is to be expected that the notions presented here are adaptable to other senses and information modalities, too. No doubt such adaptation could form the basis of a great deal of future semiotic work.

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