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Title: Signs, Links, and the Semiotics of Hypertext

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Summary: This paper examines the semiotic nature of the hypertext document from two points of view, both of which are based on Roland Barthes' ELEMENTS OF SEMIOLOGY. From the more conventional point of view, the hypertext document is discussed with respect to the four areas analyzed by Barthes: the distinction between language and speech, the relationship between the signifier and the signified, the syntagmatic and associative relationships among signs, and the hierarchical embedding of signs through connotation and metalanguage. The second examination is a hypertext document designed in such a way that the reader may EXPERIENCE Barthes' elements of semiology, rather than serve as a passive receiver of his exposition. The result is an interactive environment in its own right, entitled "Signs and Links," that, through the experience of interaction, engages the reader in the definition of the conceptual space of Barthes' text.

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Keyword(s) [Separated by ;]: hypermedia; authoring; semiotics

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SIGNS, LINKS, AND THE SEMIOTICS OF HYPERTEXT

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1. Introduction: Hypertext as Text

While hypertext and hypermedia are now well established as technologies, there are some critical underlying questions regarding the semiotic nature of hypertext (or, for that matter, whether or not hypertext *has* a semiotic structure) that have yet to be resolved. Thanks to the World Wide Web (WWW), it is becoming increasingly difficult to find anyone who has *not* been exposed to hypertext in one form or another; but the offerings on the Web vary radically in quality of presentation, reliability of content, and sometimes even risk of bringing down the computer used to read the document. Thus, while hypertext has become ubiquitous, it has yet to grow out of its novelty status. In other words, in spite of valiant efforts by scholars such as George Landow (1992), hypertext has yet to be generally accorded that status of other texts examined by critical theory. Indeed, the general public seems reluctant to recognize hypertext as a mature form of writing, deserving of the same attention we would devote to our professional literature, not to mention our daily and weekly sources of news and information.¹ Needless to say, the intrepid Web surfer will be able to find counterexamples to this claim; yet we would argue that these are isolated cases that do not reflect the current trends of hypertext writing.

What is impeding the maturing of what is supposed to be the basis for the next generation of both writing and reading? The answer to this question may reside in the very nature of hypermedia itself: a rich commingling of a wide variety of different media objects (media) all tied together by a sophisticated structure of links (hyper). This, of course, was the ideal of Vannevar

Bush (1945), although the idea of using some kind of linking structure in the service of annotation can be traced back at least as far as Elizabethan England, where we can find elaborate techniques and methods for identifying and defining links both within and between books (Jardine and Grafton, 1990). These Elizabethan origins, however, may offer at least one clue as to why this vision has not yet become quite the common practice we anticipated it would be: Both Bush and his Elizabethan predecessors maintained a clear distinction between the behaviors of *writing* and *reading*. In both historical contexts reading was not a passive matter of curling up with a good book and losing one's self in the text. Rather, reading was a very *active* process; and annotation was the principal reification of that activity. The very title of Bush's paper, "As We May Think," indicated a desire for a better connection between the respective behaviors of reading and thought; ultimately, he envisaged a brave new world for both recording and subsequently examining the annotations that would emerge from the thoughtful reading of any text. In other words hypertext was not born out of a need to enhance the expressive power of writers but rather from a need to enhance the intellectual power of readers.

Looking at the Web today, it is hard to believe that such an ideal lay behind its origins. The Web has become a heady *mélange* of media objects, available for the asking of anyone who can provide the right mix of bandwidth and patience. Tagging behind this abundance of media is a more moderate abundance of links. Here, again, patience is demanded of any would-be consumer. Some links blithely point to nowhere, some only *appear* to point to nowhere but actually lead the user to the Internet equivalent of the busy signal, some will misguide the user, some have been installed for the sake of political ideology, and many, while basically valid, may be scattered about with neither rhyme nor reason, inserted only because they happen to please the Web author.

Nevertheless, there *is* signal amidst much, if not all, of this noise; and there are text objects that deserve semiotic investigation. However, given the rampant diversity of hypertext, such an investigation must be grounded in a well-defined set of assumptions. In this study our assumptions about the hypertext document will be grounded on the current state of the art of the World

¹ Of course there are those, like Jay Bolter (1991), who would argue that such "maturity" is inappropriate for hypertext. This school of thought envisages a new generation of writing which is closer in spirit to adventure games and databases than it is to most current publications. It espouses a *revolutionary* view of hypertext. However, if we are interested in the semiotic nature of hypertext *as text*, then we should approach the technology as one that *evolves* from current writing practices (McKnight, Dillon, and Richardson, 1991).

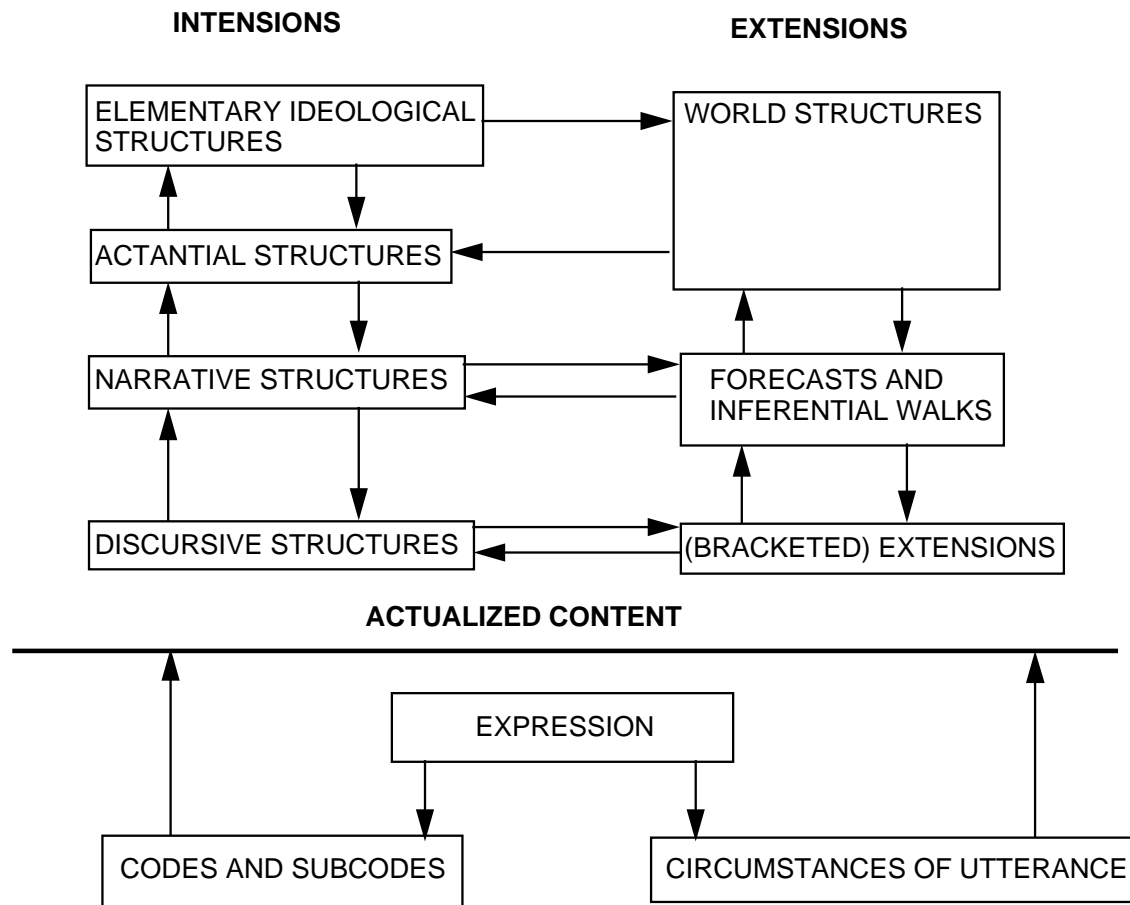


Figure 1: Diagram of reading processes (Eco, 1979a)

Wide Web and the browsers through which it is viewed. Thus, at the surface level, a hypertext document is composed of verbal text against a background of color. That verbal text is enhanced with links that allow a reader to navigate, through the text, to different loci, called "pages," which, following the terminology of Louis Hjelmslev (1963), present various aspects of the document concerned with its content or expression. The content of the link is based on the locus to which the reader is led, but a link can only be recognized as such if it has a distinctive expression. Current Web browsers tend to express links as underlined text, usually colored in blue,² with the additional feature that moving a cursor on top of a link causes both the cursor to change from an arrow to a hand and the address of its destination locus to be placed at the bottom of the browser. Link properties are the signs that indicate to the reader that the document or the content extends to another page.

Beginning with these premises, this paper will examine the semiotic nature of the hypertext document. We shall orient our argument with respect to two fundamental essays. The first is the *Elements of Semiology* of Roland Barthes (1973), which maps the conceptual space of semiotics with respect to four "dimensions:" the distinction between language and

speech, the relationship between the signifier and the signified, the syntagmatic and associative relationships among signs, and the hierarchical embedding of signs through connotation and metasemiotics. The second is "The Role of the Reader," by Umberto Eco (1979a), which presents an analysis of reading in terms of ten interacting processes illustrated in Figure 1, a simplified version of Eco's own diagram.

In Section 2 we attempt to interpret each of Barthes "dimensions" with respect to hypertext. Unfortunately, this attempt breaks down in some rather significant ways, raising questions as to how links may be situated with respect to these dimensions. We respond to these questions by shifting our attention from the nature of the text itself to the issue of how a text is *experienced* in the course of reading. We demonstrate this shift at the beginning of Section 3 with a hypertext document designed in such a way that the reader may experience Barthes' elements of semiology. We view this experiential stance as a contrast to the model in Figure 1, which essentially views reading as an elaborate activity of decoding expression into content. In other words content is arrived at not through a variety of instances of *derivational reasoning*, corresponding to the different boxes in Figure 1, but through experiencing the activities that engage the reader while reading is taking place. We then revisit Barthes' dimensions of the conceptual space of semiotics in light of this example document and demonstrate that the document also offers some

² Another convention is that links change their color, usually to red, if they have been recently traversed.

distinctions between the respective roles of reader and writer that have not received very much attention. We present our conclusions about these distinctions in Section 4.

2. The Semiotic Nature of Hypertext

2.1 Language and Speech

The basic principles of semiotics, as presented by Barthes (1973), have their origins in the course of lectures on linguistics delivered at the University of Geneva by Ferdinand de Saussure at the beginning of this century. One of the first issues Saussure dealt with was the need to draw a distinction between language and speech. Some of the observations he makes to clarify this distinction are as follows (de Saussure, 1986):

Linguistic structure is only one part of language, even though it is an essential part. The structure of a language is a social product of our language faculty.

...

By distinguishing between language itself and speech, we distinguish at the same time: (1) what is social from what is individual, and (2) what is essential from what is ancillary and more or less accidental.

The language itself is not a function of the speaker. It is the product passively registered by the individual. It never requires premeditation, and reflexion enters into it only for the activity of classifying

Speech, on the contrary, is an individual act of the will and the intelligence, in which one must distinguish: (1) the combinations through which the speaker uses the code provided by the language in order to express his own thought, and (2) the psycho-physical mechanism which enables him to externalise these combinations.

Finally, Saussure resorts to music as a source for a metaphor to explain his distinction (de Saussure, 1986): "The symphony has a reality of its own, which is independent of the way in which it is performed."

Speech thus has to do with how the *performance* or *presentation* of the content of a communicative act is perceived (by a "reader"); and language defines the *conditions* under which such an act takes place. As Barthes (1973) puts it, language "is essentially a collective contract which one must accept in its entirety if one wishes to communicate."³ For documents⁴ on the

World Wide Web, that contract is embodied in the specification of the HyperText Markup Language (HTML) (Daly and Bowen, 1995).

The nature of the speech of hypertext, on the other hand, is more problematic. The simplest approach would be to argue that the speech of the World Wide Web consists of the individual pages accessible by a reader, each of which may be examined by any Web browser by virtue of its conformance to HTML specifications. However, this would be confusing speech with its physical instantiation, similar to declaring that the speech of verbal text consists of the pages on which that text is printed. The heart of our problem lies in being able to translate adequately a sense of *performance* from verbal text to hypertext. There are several aspects of this difficulty. First of all, the active role the reader must often take in interpreting the intent of the hypertext author can blur the distinction between writer and reader. This further complicates the situation for the writer, who now must take into account the nature of reader behavior.

Unfortunately, we know very little about how readers of WWW hypertext behave. We have no end of anecdotal jokes about waiting for Web pages to be loaded, but we need to know more quantitatively how much time readers spend looking at any given page before deciding to surf to another page. Similarly, we need to examine the extent to which the decision to click is influenced by the *presence* of a link or by its *layout*: how it is positioned within a page (or screen image) or where it is situated within the content of the body of the text. Put another way, is the reading in the decoding of the signs on any given page; or is it in charting the course of surfing from page to page? Is the reader navigating the content of the text or the structure of the document? Without answers to such questions we cannot build a valid model of what it means to *perform* hypertext on the World Wide Web. We run the risk of a characterization of speech that may be as relevant as the tree falling in a forest with no one to hear it. In other words our very sense of *what speech is* is so tenuous that our ability to pursue Saussure's semiotic agenda may be open to significant doubts.

2.2 Signifiers and Signifieds

Are other aspects of Saussure's agenda equally problematic? Consider the very nature of the hypertext sign. Recall the detailed and analytic precision applied to the examination of the linguistic sign (de Saussure, 1986):

A linguistic sign is not a link between a thing and a name, but between a concept and a sound pattern. The sound pattern is not actually a sound; for a sound is something

³ The parties involved in this contract are, of course, the writer and the reader.

⁴ In the interest of accommodating the generality of text, we shall take the term "document" to mean any physical instantiation of speech.

physical. A sound pattern is the hearer's psychological impression of a sound, as given to him by the evidence of his senses. This sound pattern may be called a 'material' element only in that it is the representation of our sensory impressions. The sound pattern may thus be distinguished from the other element associated with it in a linguistic sign. This other element is generally of a more abstract kind: the concept.

As semiotics has matured from Saussure's hypothesized science to a more developed discipline, these components have come to be called, respectively, the *signifier* (pattern of stimuli) and the *signified* (concept). As was suggested in Section 1, Hjelmslev (1963) has also introduced terminology by which the signifier of a sign is called its *expression*; and the signified is called its *content*.

What are the signifiers of WWW hypertext? Once again, this is a question that can only be addressed with respect to the characteristics of reader behavior. Just as the signifiers of spoken language are sound patterns, the signifiers of Web pages can only be patterns that readers perceive among the bits that constitute the window of the Web browser. Fortunately, many of these patterns are based on reading conventions that precede hypertext. Thus, readers tend to deal with verbal text and images on a computer screen the same as if they were encountered in a printed book. The only significant difference lies in the links; and, as was observed in Section 1, Web browsers have tended to conform to some basic conventions (underlining the text, coloring it blue, displaying the cursor as a hand when it is moved into a region corresponding to a link) according to which signifiers for links may be recognized.

What is the signified of such a link sign? In Section 1 we simply claimed that it was "based on the locus to which the reader is led." However, while this is a straightforward enough way to view links as signs, links still introduce complications that are generally not associated with other signs. While one of the most important properties of a sign is that the association between signifier and signified is purely arbitrary (de Saussure, 1986), that association tends to have a *persistence* in most signs that may not be found among links. Thus, dictionaries work because the number of signifieds that may be associated with a lexical signifier is limited; so a specific association can almost always be inferred from context.

On the other hand the associations between signifier and signified among link signs are less likely to have this sort of persistence; and, in the absence of such persistence, the structure of the signifier offers no clues as to the nature of the signified, the way such clues are often embodied in the lexical structure of text or the features of an image. The signifier only informs the reader of the potential for the action of going to another part of the document or possibly even another document. Thus, the signifier is associated with a *movement* of

some sort; but the reader often can only establish the destination of that movement by actually making it, i.e., clicking on the link signifier.

Consider the quotation from Barthes in Section 2.1. Barthes has added italic emphasis to the word "discourse." Suppose this passage were translated into HTML and this emphasized word were marked as a link signifier. We can assume that this link will pertain to discourse within the context of Barthes' text, but we don't know for sure. Similarly, when we read Barthes as text, we know that he is exploring, among other things, how the concept of discourse may be signified by many things and that reading is often an exercise in refining such uncertainty into greater certainty.

Eco (1979a) (Figure 1) frames this aspect of the interpretation of link signs as the formation of "forecasts and inferential walks." In other words the reader is always actively hypothesizing; but, while the model in Figure 1 appears to situate all of these hypotheses on what Hjelmslev (1963) called the plane of content, they are as likely to be required on the plane of expression. Hypotheses must be formulated and tested with respect to how signifiers are both *recognized* and *interpreted*; but, because the experience of reading does not afford enough commonalities of link behavior to provide a logical foundation upon which such hypotheses may be erected,⁵ these inferential walks are easily led astray. This gives links the potential to be far more problematic than just about all other signs encountered in reading experiences.

2.3 Syntagmatic and Associative Relationships

Having considered the nature of the sign itself, we next turn to the nature of relations among signs. Saussure classifies these relations into two categories that "correspond to two different forms of mental activity, both indispensable to the workings of a language" (de Saussure, 1986).⁶ These relation categories are called *syntagmatic* and *associative*.

The distinction between these two categories is based on whether or not the relationship among the signs involves *ordering*. Associative relations do not involve ordering. They only concern the collection of signs into a set. In other words associative relations are relations of categorization. In language, on the other hand, syntagmatic relations involve a linear ordering. This could be the ordering of words to form a sentence, but it

⁵ We often rely on conventions regarding how verbal and image signifiers are associated with their signifieds, but these conventions are lacking for link signifiers. Thus, the association of a link signifier can only be made "on the spot," while reading is taking place. A link is not obliged to offer any clues about where it leads.

⁶ Saussure's claim about "mental activity" was, at best, a sharp intuition; but this correspondence was subsequently grounded in a more clinical reality by Roman Jakobson (1995).

can also be the ordering of morphemes to form a word. Of course, since semiotics is an attempt to generalize the study of signs beyond their role in language, when we progress beyond language this ordering need no longer necessarily be linear; but the distinction between relationships of unordered collection (associative) and ordered structure (syntagmatic) is still important.

While the signifiers of verbal text can usually be easily sorted according to whether they participate in associative or syntagmatic relationships, a link in a hypertext environment can embody *both* relationships, often depending on the perspective of the writer or the reader. From the writer's perspective the relationship is likely to be syntagmatic, because the writer knows the signified properties of the links. On the other hand, if the perspective is from the reader, it is always associative, since the reader is not certain of the signified until the link is followed. Thus, the reader must engage in a new form of "forecasts and inferential walks," taking clues from the layout as well as the content of the document and background knowledge about the author. The results of these inferences will be decisions about which links to click and when, if ever, they should be clicked.

For example, one may compose a text, such as *Elements of Semiology* (Barthes, 1973), in which a concept is illustrated with several concrete examples. When this text is presented as a printed book, these examples must be assigned a specific order; but the reader should not necessarily be compelled to respect that order. A hypertext presentation could assign the examples to separate link destinations and design a layout to suggest that the relationship among those links is associative, rather than syntagmatic. Since the signifier-signified relationship of the link signs lacks the persistence of other signs and is therefore fundamentally opaque,⁷ the reader can only infer syntagmatic and associative relationships from the expression of the text taken as a whole. The obligation rests with the writer to design the layout in such a way that the reader may distinguish these two types of relationships. Layout is thus more than a matter of aesthetics; it may be the only source of cues for reader behavior through which link signs may be effectively interpreted.

2.4 Connotation and Metasemiotics

In addition to examining relationships *among* signs, we may consider the possibility that a sign may also serve as either the signifier or the signified in *another*, "higher level," sign. This possibility has been discussed by Hjelmslev (1963) as follows:

⁷ A sign is said to be *referentially opaque* if it cannot be evaluated strictly on the basis of its formal structure; this concept tends to be less relevant to natural language than it is to computer programming languages, where the referential transparency of symbolic expressions significantly facilitates their interpretation (Tennent, 1976).

It still remains, through a final broadening of our horizon, to indicate that there are also semiotics whose expression plane is a semiotic and semiotics whose content plane is a semiotic. The former we shall call *connotative semiotics*, the latter *metasemiotics*.

In other words the signifier of a sign may, itself, be subject to a "lower level" semiotics, which is what Hjelmslev calls the connotative semiotics of the "higher level" sign; and the signified of that same sign may also be subject to a "lower level" semiotics, which is what Hjelmslev calls the metasemiotics of the "higher level" sign.

Examples of metasemiotics are easy to find, as has been observed by Barthes (1973):

It is evident that semiology, for instance, is a metalanguage, since as a second-order system it takes over a first language (or language-object) which is the system under scrutiny; and this system-object is signified through the metalanguage of semiology. The notion of metalanguage must not be confined to scientific languages; when ordinary language, in its denoted state, takes over a system of signifying objects, it becomes an 'operation', that is, a metalanguage. This is the case, for instance, with the fashion magazine which 'speaks' the significations of garments, just as one speaks a language; this, however, is only ideally speaking, for magazines do not usually exhibit a purely denoted discourse, so that eventually we deal here with a complex ensemble, where language, at its denoted level, is a metalanguage, but where this metalanguage is in its turn caught up in a process of connotation.

This process of connotation is one in which what is signified is some *ideology*, and the signifiers engaged to signify that ideology are themselves signs that are elements of a *rhetoric*. Those rhetorical elements are, in turn, the signifieds of a metasemiotic; and, through that metasemiotic, each of them is seen to be a sign consisting of its own signifier and signified. In the world of hypertext, on the other hand, the conventions of rhetoric give way to the constraints of HTML. Like any programming language, HTML may be described by a formal specification language; so its individual markup elements, specifying objects like headings, anchors, and links, are similarly all signifieds of a metasemiotic. This is clearly a situation that gets very complicated very rapidly, but those complications in turn help to identify those questions that must be addressed in dealing with the role of documents in communicative acts.

We begin with the assumption than any document is *about* something. We thus have a single (large and

complex) sign in which the document itself is a signifier and what the document is about is a signified. In this case *both* the signifier and the signified are likely to be comparably complex signs. The structure of the signified sign must capture the structure of the subject matter, such as the structure of languages, in the case of semiology, or the structure of garments, in the case of the fashion magazine. Thus, the document itself must engage in the use of a metasemiotic in being able to discuss its content: It can only document that content if documentation includes some level of addressing the structure of that content. At the same time the signifier sign also has structure; and, if that sign is a Web page, that structure is given by the specification for HTML. In other words the actual elements of presentation of a WWW document are, themselves, the signifieds of signs whose signifiers draw upon the specific media that constitute the document; so the means by which the document is actually *about* its content are achieved through a connotative semiotic whose connotations (the second-order signs that constitute the signifiers) are elements of the HTML structure.

Once again, however, problems arise when we start to deal with the specifics of links. As we hope the above examples have demonstrated, the inherent referential opacity of the link sign makes it extremely difficult to define a metasemiotic. Indeed, that metasemiotic cannot be independent of a model of reader behavior; and, if there is too much variation in behavior across a population of readers, there may be an insufficient foundation for the logical definition of *any* such metasemiotic. At best, as we saw in Section 2.3, we may be able to associate some metasemiotic with cues based on layout; but this can never be more than a portion of the story of how links are interpreted by readers unless we have a model that can predict absolutely how all readers will respond to those cues, a premise that is, for all intents and purposes, practically absurd. If we want to integrate matters of reader behavior, then we are going to have to draw on more powerful concepts than metasemiotics and connotation. We shall now address how this problem may be approached.

3. Hypertext as an Experiential Document

Section 2 was based on an attempt at an analytic reading of Barthes' enumeration of the elements of semiology. Unfortunately, this attempt led to serious difficulties when we had to interpret Barthes' text with respect to the domain of hypertext and particularly with the desire to view the links in that domain as signs. We shall now demonstrate an alternative approach to Barthes' text. This time, however, we shall treat it, not as an exposition to be interpreted, but as an *experience* to be interpreted. Through this approach we hope to demonstrate that it is, after all, possible to make sense of Barthes' content but that the path to this sense-making is not only more elliptic but necessarily so. In other words if we wish to answer the question "What has semiotics to

do with hypertext?" we are more likely to encounter a useful answer by way of an actual hypertext experience than through a more conventional analytic exposition.

3.1 "Signs and Links"

"Signs and Links" was put together by one of us⁸ to challenge current notions about hypertext. The key features of this piece are the way in which the boundaries between the signifier and signified are blurred, the patterns that guide readers of hypertext, and the value of experience in reading hypertext. At the top level the document is clearly structured sequentially into two parts.

"Signs and Links" begins by confronting the reader with a screen that is entirely blank except for the presence of the text "[What is this?](#)" in the center. This text has been designed to look like a link, underlined and colored blue; but it isn't. Having the reader identify the appearance of the text as a link allows her to become aware of the *act* of signifying. The reader acts upon her assumption about the signified by clicking on what she takes to be a link signifier, and this obliges her to deal with issues of connotation and metasemiotics: First, an inference based on structural knowledge of link signs is negated, because, when the reader clicks on this sign, nothing happens; thus, "[What is this?](#)" reveals itself as a quintessential metasemiotic question.

Unfortunately, the answer to this question confronts the reader with an impasse: What a link signifies can only be answered by clicking on it; but this action, the only apparent one that the reader can take, has no effect. At this point the astute reader will discover a scroll bar running along the right side of the image. Thus, like the link, the impasse is also false. The action of scrolling is available as another possibility. Taking it reveals a paragraph of text:

That was an image that looked like a link. It was a sign that made you think it was a link. In semiology signs mean something. They are things which stand for other things. Words are signs but not the only kind of sign. Images, gestures, sounds, etc. are also signs. So...

[What is this?](#)

Once again the same image that looks like a link is displayed; but this time the link is a real one, taking the reader to the next page. In fact the same signifier—"What is this?"—is used to take the reader to successive pages for the remainder of the first part of "Signs and Links." Thus, the semiotic of this link sign is such that the signifier stays the same while the signified changes with each occurrence; but, at the *metasemiotic* level, these signifieds share an invariant property by indicating the next thing to be read in the course of this first part. This metasemiotic role can be easily hypothesized by the reader, but every hypothesis can only be tested by clicking on its associated link sign.

⁸ Tina Schneider, hereafter referred to as "the artist."

The second part of "Signs and Links" continues to challenge readers' assumptions about links that are embedded in a body of text. There are punctuation marks, letters in the center of words, phrases, electronic mail addresses, footnotes, URLs, and [back](#) and [forward](#) labels that are highlighted as links. None of these, in the context of the piece, necessarily stand for what they say they mean. Also, the links are part of a body of text that includes the artist's own thoughts about links, along with sections reproduced directly from *Elements of Semiology* (Barthes, 1973). The point of the piece is not to decode expository text, but to interpret the experience of exploring links that have been designed to reveal the semiotic elements of hypertext.

Thus, as in the first part, the artist anticipates that a reader would discover the process by which we go about determining the signified of a hypertext document. However, in this second part the complexity of the choices—several links to a page (as opposed to the single link example from the first section)—also reveals patterns that readers exhibit when they approach a hypertext document. The first pattern involves finding links on a page, thus determining that it is a hypertext document.⁹ Next involves looking at where links are in relation both to the layout of the page and to the content of the text. This is the basis for the "forecasts and inferential walks" by which the reader tries to associate signifieds with all of the link signifiers, as discussed in Section 2.2. At one level we understand that the low level signification for a link is that it goes or does something when we click on it. This is also signified by the URL address displayed at the bottom of the browser, as well as by the cursor changing from an arrow to a hand. However, as was demonstrated earlier, we can only discover the higher level of signification of any link signifier by clicking on it.

Thus, readers are presented with some choices when they begin to read the document. The first is to determine the value of the links by clicking on them right away and, perhaps, determining the body of reading.¹⁰ The second is to click on the links in a linear fashion making decisions as they appear during the reading. The third is to ignore the links until the end of reading the page. No matter what choice is made, however, all of them are subordinate to one assumption: the value of the link is revealed only through interaction.

Even when the URL indicates that a link would go to a particular address, it does not guarantee that the value (the high level signification) of the link will be known. It only satisfies the low level interpretation, which is that the link will take the reader someplace. Even on the first page of the second part of "Signs and Links," the reader is not sure that the signified of the link sign "[discourse](#)" will relate to discourse as it pertains to

⁹ The reader is actually prepared for this pattern while engaged with the first part of the document.

¹⁰ This process could determine the length and depth of the document structure as well as the depth of the content.

the context of semiotics. As was discussed in Section 2.2, one could forecast that, if clicked, the link would lead to Barthes' interpretation or definition of "discourse;" but there is no way to know this unless the link is clicked and the page is read. As it stands, the link takes the reader to a page whose entire contents is as follows:

Reading Hyperlinks

These links don't go anywhere, but how would you know that?

The URL indicated an address, and another page did come up. Unfortunately, the content did not pertain to what was connoted by the signifier "[discourse](#)" on the first page. Furthermore, the reader has been deliberately "stranded" on this page, left with no links at all. The only way to get back to the rest of the text is through the navigation operators provided by the Web browser (such as a "Back" command).

What compels a reader to choose to follow a link depends on the respective values she places on those link signifiers that are displayed as they relate to the content of the document, but this choice still does not determine the signified property of the selected link. It only adheres to an aesthetic of the reading experience—keeping a particular reading rhythm induced by the author's design decisions and played out by the reader. This demonstrates that the links remain vital, but disjointed, from the reading experience, even when they are not clicked.

3.2 *The Blurring of Semiotic Boundaries*

Let us return now to the more analytical approach to *Elements of Semiology* (Barthes, 1973). In Section 2 we tried to indicate that the semiotic nature of hypertext could reveal a breakdown in the conceptual infrastructure proposed by Barthes. We shall examine that infrastructure in the light of our experience with the concrete example of "Signs and Links."

3.2.1 Signifiers and Signifieds

Hypertext cannot be read as such unless we know how to recognize link signifiers. "Signs and Links" begins by reminding us that such recognition has become grounded in conventions shared by just about all Web browser technology; but it also begins by demonstrating how easy it is to thwart those conventions. However, this initial gesture is essentially an invitation to skepticism that sharpens the reader's alertness for the rest of the document, even though those conventions are honored through the entirety of that remainder. Instead, the reader's skepticism is directed at the relationship between a link signifier and what is signified. What is now thwarted is just about any attempt the reader makes at formulating a forecast or setting off on an inferential walk.

3.2.2 Language and Speech

We may now return to the question raised at the end of Section 2.1: an uncertainty of just what speech is in

the medium of hypertext. We know that speech is the act of performance through which signifiers are passed from the writer to the reader; but writer and reader view the same signifiers from different perspectives. The reader must worry about how signifiers are identified; but the writer must bear in mind that a reader can find perceptual patterns in just about any stimuli and must therefore ask what techniques must be engaged to get the reader to identify the "right" signifiers. Furthermore, the writer will not always have the objective of getting the reader to share her perspective as efficiently and accurately as possible. An effective performance may involve the performer being able to move with agility along a continuum between clarity and deception. Like the text by Alphonse Allais analyzed by Eco (1979b), "Signs and Links" makes some of its most critical points through deception. Regardless of the traditional teaching of rhetoric (Ong, 1982), the richness of verbal speech is based as much on devious tricks as it is on "plain speaking." "Signs and Links" demonstrates that hypertext can be just as flexible; but the general question of what it means to perform hypertext remains open to extensive further investigation.

3.2.3 Syntagmatic and Associative Relationships

"Signs and Links" thus derives much of its power from the fact that the writer has assumed a perspective that is deliberately closed to the reader: The writer has a clear sense of what the link signs are and how they are related, both syntagmatically and associatively; the reader, on the other hand, can do little more than try to discover associations. As they are discovered, she may then undertake inferential walks in an attempt to tease out syntagmatic relations; but, since attempts at inference are already being challenged with respect to what signifiers signify, hypothesizing a structural order is an even greater challenge. The most assiduous reader can, of course, like an explorer of *terra incognita* or a dedicated player of software adventure games, try to map her progress, compiling a document external to "Signs and Links" that keeps track of where she has been and the paths she has traversed.¹¹ However, such a

¹¹ One reader, upon discovering that the URL for the current page was <http://goofy.pal.xerox.com/art/art/tina1.htm> decided to select manually <http://goofy.pal.xerox.com/art/art/tina2.htm> as the next page to be read. This metasemiotic strategy of inferring a syntagmatic relation based on the lexical structure of the URL enabled a systematic exploration of all of the artist's comments on Barthes' text without ever encountering the links in the Barthes source that led to those comments. One could employ a similar technique upon discovering that the URL for one of the Barthes pages was <http://goofy.pal.xerox.com/art/art/barthes/b2.htm>. (Such a reader would quickly discover that <http://goofy.pal.xerox.com/art/art/barthes/b1.htm> was not a valid URL!)

document can never be more than a map of her personal reading experience, rather than a representation of the writer's syntagmatic relations among the link signs. Ultimately, "Signs and Links" derives much of its aesthetic value from the impenetrability of the writer's syntagmatic relations and the reader's eventual discovery that this impenetrability does not necessarily diminish, and may even enhance, the experience of the reading.¹²

3.2.4 Connotation and Metalanguage

Perhaps the most important feature of "Signs and Links" is the way in which it reveals to the reader the richness of structure on the plane of expression, as well as the plane of content. The reader is basically obliged to discover the connotative semiotics and metasemiotics, without which this document would have hardly any value.¹³ Thus, the document is an exercise in exploring the layers of signifiers and signifieds that lie beneath complex signs. Furthermore, it is designed in such a way that the act of exploration can be just as appealing to the reader as that which is discovered as a consequence of that exploration. This appears to be one of the major objectives that Eco had in mind when he undertook to write a work of detective fiction as an instantiation of his theories (Eco, 1984). "Signs and Links" performs a similar exercise, instantiating the result this time as a hypertext document.

4. The Roles of Reader and Writer

In Section 3.1 we deliberately wrote that "Signs and Links" "demonstrates," rather than "illustrates," its observations about links. Those observations were emphasized *through* the reading experience. The body of text talks a little about the dominance of links. It also highlights excerpts from *Elements of Semiology* (Barthes, 1973); but the role of those excerpts is secondary to the main purpose and meaning of the entire document, which is to experience the susceptible semiotic nature of hypertext. Because of the property of interaction, the element of choice and interpretation of links begins to play a foreground presence in the act of reading.

It is this need to plan for the element of choice that makes the writing of hypertext different from that of other texts. The reader who must make choices and, by virtue of those choices, undertake an exploration is not really accounted for by the model in Figure 1; and, consequently, the writer of hypertext is furnishing more than some set of codes and subcodes that drive a complex of interpretive reasoning by the reader. As was asserted when we addressed the question of speech in Section 2.1, the writer of hypertext is ultimately a

¹² Provoking the reader into discovering that the text may be read according to a metasemiotic strategy is an example of such an enhancement.

¹³ These discoveries, in turn as we have seen, may provide the reader with new strategies for reading.

performer. However, because her performance can only be sustained by the reader willfully engaging in interaction, that performance is significantly different from the "speech" of just about all other texts.

There are not yet clear and definitive answers to the question of what constitutes the performance of hypertext. For one thing there are not yet enough instances of effective performances that can furnish data against which that question may be addressed. Perhaps the most important lesson of "Signs and Links" is that, as far as the ultimate goal of communication is concerned, inducing an experience can sometimes be as effective as presenting a set of codes and subcodes to be interpreted. As we continue to write more hypertext, we should endeavour to build up an expertise in this technique of inducing experience; and, as we acquire greater mastery of that expertise, we may begin to approach an answer to the question of what constitutes the performance of hypertext.

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