The influence of culture on the perception of the environment

and how it is applied to wayfinding design

by

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TABLE OF CONTENTS

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INTRODUCTION

The process of navigating is one that has been a part of people's lives since the time they were brought upon this earth. People have relied on various signs throughout the years to aid them while navigating. Landmarks, ranging from a specific tree to a giant cathedral, have become key reference points for those giving and following directions. Sailors relied on stars to help them navigate. Whatever the sign may be, whether it is in the form of a tree or a star, the fact remains that people rely on signs for navigation.

Providing directions, however, can be a difficult task. One must consider the many variables that can play a role in determining how a person will decipher the information provided and how well it is communicated. People decipher and structure information based on their sense of reality, a process that is influenced by their cultural surroundings. People also structure information according to their wayfinding abilities, which involves navigating based on directional signage or navigating from stored configurational knowledge. Wayfinding abilities can also be effected by whether a person incorporates cardinal directions while navigation, for quite a few people do not.

Designers of signage systems that guide people through a public space must consider the effects of all of these variables. Designing a system towards only those who rely on configurational knowledge, for example, will cause those who rely on following signs to become disoriented and eventually become lost. This thesis will explore why these variables exist and techniques that designers can incorporate in order to compensate for these variables in their designs. The Literature Review of this thesis will first discuss the role of culture in the structuring of signs in the areas of language, architecture, and graphic design. The second part of the Literature Review will discuss the psychological process of wayfinding, how culture

influences this process, and the techniques that designers can incorporate to aid in the wayfinding of various users. The information presented in the Literature Review will then be applied to a case study of a public environment, the Mall of America in Minnesota, in which the graphic and architectural signs will be analyzed as to how they accommodate users. Recommendations will be given for those areas in the analysis that are lacking in effective wayfinding design. The case study was developed as a guide for analyzing the content of graphic and architectural signs in public environments and therefore can be used to analyze other public environments other than the one presented.

LITERATURE REVIEW

Language, architecture, and graphic design

The culture of a community determines how language and architecture are to be structured. By understanding how a culture influences the actions of a community, how that culture communicates, and how it designs its buildings enables graphic designers to apply these cultural aspects to the design of signage systems for public buildings. The consideration of these cultural influences will allow designers to facilitate the wayfinding abilities of varying cultures.

This first part of the thesis will demonstrate how signs are defined and determined in language, and also how these signs affect communication and behavior within a culture. It will then be shown how architecture is composed of signs and how these signs are determined by cultural influence. Once these areas are explained, the interrelatedness of language and architecture in terms of semiotics will be discussed. Lastly, an explanation of how the definition of a sign in the field of graphic design fails to incorporate language and architecture, and focuses on other aspects, like the physical qualities of the object represented. By not relating graphic signs to the signs of architecture and language, designers overlook the cultural aspects that will eventually prevent a person from finding his or her destination in a public building.

How signs and codes are determined by language

The definition of a sign within the field of language has developed into two interpretations. Saussure explained a sign in terms of a signifier and a signified. The signifier

is the visible component, the actual word (the letters) or the object itself. The signified is the invisible component, or the meaning behind the word or object. A more explicit interpretation was developed by C. S. Peirce. His definition is divided into three components: a representatum (the signifier), the object (what the signifier refers to), and the interpretant (the meaning). Most linguists refer to Saussure's definition for its concisiveness, but will refer to Peirce's definition when wanting a more explicit explanation.

Signs can be classified into three different categories: an icon, an index, and a symbol. Each category is defined by the relationship between the signifier and the signified, according to Wendy Leeds-Hurwitz in her book, Semiotics and Communication: Signs, Codes, and Cultures. An icon is defined by a relationship of similarity between the visible and invisible components. For example, a photograph of a bride is an icon. The picture is a direct relationship to the bride at the time the picture was taken. An index is defined by a relationship of contiguity or connection, using a part to stand for the whole. For example, saving the top of the wedding cake for the first anniversary is an index for the whole event of the wedding. A symbol is defined by a relationship of arbitrariness, or an arbitrary connection between visible and invisible components. For example, in Western culture a white dress worn by the bride is symbolic of virginity.

At times, signs may have a combination of relationships. A wedding band can collectively be a symbol for a relationship, an index of the wedding ceremony, and an icon for a mother's ring (if it was replicated). Symbols are known to carry the most emotional connotation amongst the categories.

Signs are also defined by the amount of motivation and convention within the relationship between the signifiers and signifieds. The amount of motivation is determined by the "degree to which the signified determines the signifier" (Leeds-Hurwitz 1993, 26). An example of high motivation would be the presence of flowers at a wedding signifying new life, which is highly associated with the ceremony signifying the new life of the bride and groom.

Low motivation would be the relationship of red roses signifying love, a relationship that is based on a symbolic meaning. The amount of convention is determined by the "degree of tradition or habit associated with a particular sign" (Leeds-Hurwitz 1993, 26). An example of this is the use of stick figures in signs identifying restrooms. The stick figures become a learned association for a restroom.

Once a sign is established, its meaning can be evaluated in terms of its denotative and connotative definitions. The denotative meaning is "the explicit, obvious, straightforward, first meaning of a sign" (Leeds-Hurwitz 1993, 26). The connotative meaning is the implicit meaning imposed by a specific culture (Leeds-Hurwitz 1993). The denotative meaning crosses cultural boundaries, whereas the connotative meaning does not. For example, a wedding cake denotes food, and connotes time spent making the cake, tradition, and money.

Many complex signs or symbols must be acquired through learning or repetitive exposure. Symbols are, most importantly, part of a culture, and each culture has its own symbols. These symbols become part of the social world, and adults teach them to children through description. Certain symbols, called key symbols, carry more weight than others in a culture. For example, in the American culture the turkey is a key symbol for Thanksgiving. Key symbols can be people, ideas, texts, objects, or behaviors.

It is through symbols that "people create a social reality for themselves, an overlay of meaning laid across the natural world" (Leeds-Hurwitz 1993, 33). Symbols have two functions in this social reality: first, they provide a tool for making sense of the world—they reflexively tell us about ourselves and they store information in small spaces; second, they are "tools for changing the world ... symbols are one vital component of a power struggle over whose ideas, whose constructions of reality, whose interpretations, will come to be accepted as the norm" (Leeds-Hurwitz 1993, 34). A symbol can lose its power, however, if it is not interpreted in the same way by many people.

Leeds-Hurwitz describes a code as a group or set of signs and the rules for their use. These sets are determined by the relations between signs. Signs are best understood in terms of sets, which could also be described as a context. O'Sullivan et al. describe codes as, " Codes convey meaning derived from the agreement among and shared cultural experience of their users" (Leeds-Hurwitz 1993, 53). Codes also classify and organize material for purposes of communication. They are indicative of a social reality bound to culture and context.

Codes, in effect, determine group behavior in a culture. A. G. Smith, who wrote the book, Communication and Culture: Readings in the Codes of Human Interaction, states,

> Meaning is a product of coding, and coding is a form of behavior that is learned and shared by the members of a communication group...Coding is learned and shared, and any behavior that is learned and shared is cultural (Leeds-Hurwitz 1993, 60).

Shared behavior leads to encoding and decoding of similar meanings, and it also indicates group membership.

Culture itself is a system of codes (Leeds-Hurwitz 1993). It is a system in which its rules indicate behavioral patterns and responses. In conversing, people predict what others will say in order to understand the situation. They make two kinds of predictions: the first one is a generic prediction of the possible combinations of meanings that could result; the second is a prediction of how the information is organized, such as how each phrase is linked with the next.

M. A. K. Halliday, who wrote an essay about language as code, states that the linguistic choice of the speaker is a cultural choice; "we project the linguistic system on to the social system...interpreting verbal meanings as the expression of the meanings that are inherent in the culture" (Fawcett, Halliday et al. 1984, 9). People choose language based on the cultural standard for linguistics and the environmental setting. Without culture as an underlying structural grid, no organization would exist in language, and there would be no way of "creating and modifying the structure of reality" (Fawcett, Halliday et al. 1984, 10). Once a

system is developed by a culture, it becomes an independent existence and creates meanings on its own, which in turn becomes part of the culture (Fawcett, Halliday et al. 1984). For example, semantic acts of greeting are part of the cultural semiotic, and therefore possess social value in predicting behavior.

Both non-verbal and verbal behavior are governed by the semantic codes of a culture. This brings about two modes of reality, a concrete (or denotative) and a symbolic (or connotative). The concrete reality is the physical quality of the object or situation, such as the environmental setting. The symbolic reality is the cultural meaning attached to the situation, such as fireworks on the Fourth of July. Once the symbolic reality has precedence over the concrete reality, the symbolic reality is then seen as an egocentric view on the situation.

The interpreted view of reality can ultimately affect modes of communication. When delivering a message, a person should remember that "signs do not occur in isolation...a sign only conveys information when it is combined with other signs and symbols from the same context" (Leach 1976, 13). Most non-verbal messages can only be understood if the receiver is familiar with its usage in that culture, for the meaning behind bodily movements and gestures vary from culture to culture. For instance, the "OK" hand gesture of Americans would be interpreted as money in Japan, as zero in France, and as an insult in ancient Greece. Thomas A. Sebeok, a linguistic, defined semiotics as:

> the formulation and encoding of messages by sources, the transmission of these messages through channels, the decoding and interpretation of these messages by destinations, and their signification (Sebeok 1985, 451).

The formulation, the transmission, the interpretation, and the signification are all culturally influenced. Without the knowledge of how these processes work, communication would not be possible.

Sebeok categorized messages into three types: iconic, indexical, and symbolic.

An iconic message is one that "resembles some agent of the real world to which it refers" (Sebeok 1985, 456). The American flag is delivering an iconic message of fifty stars referring to fifty states. It is a relation that can only be understood by those familiar with the code. An indexical message is one that "points to an object or is a sample of it" (Sebeok 1985, 456). Most of these are verbal, such as pronouns and words like "today". Much of the message's meaning depends on a time and place (context). A symbolic message is one that is an arbitrary relationship based on pre-existing social conventions. Its interpretation will depend on the person's knowledge of the cultural codes and the context in which it is used. The sight of an American flag during a burial at Arlington National Ceremony will only carry its emotional message to those familiar with the setting and the symbolism of the flag in this context.

How signs and codes are expressed in architecture

As indicated, an important part of cultural influence is the context of the message. Context influences the interpretation of the message and helps to indicate its significance and credibility. Yet the message can alter the context. The example of the wedding ceremony held at a football field is an altering of the contextual meaning of the field.

Context is mainly composed of architectural dwellings or configurations and their environment. Architecture itself is a stimulus to which people respond when interpreting their surroundings and situations. Architecture communicates its function and brings conformity to an act or behavior within a culture. A staircase indicates the function of moving upward to another level. Perceivers learn to respond to the stimulus of the stair and use this knowledge when trying to interpret a message in this context.

Architecture can also be defined in terms of the linguistic qualities of signifiers and signifieds. Charles Jencks, who wrote "The Architectural Sign" described this relationship as:

Architecture is the use of formal signifiers (materials and enclosures) to articulate signifieds (ways of life, values, functions) making use of certain means (structural, economic, technical and mechanical) (Broadbent, Bunt, and Jencks 1980, 72).

The architectural sign is twofold. The first component is a plane of expression (the signifier), which includes the physical aspects of form, space, surface, and volume. These qualities incorporate the properties of rhythm, color, and texture. A second level of signifiers exists in this plane, consisting of forms of expression—noise, smell, tactility, and heat. The second component of a sign is the plane of content (the signified), which includes an idea or set of ideas, mostly spatial concepts, ideologies, social customs, and proxemics.

The relationship of signifier to signified determines what type the sign will be, whether it is an icon, index, or symbol. Iconic signs are relatively motivated. They stand for functional aspects of the architecture and "the use of forms and materials according to their inherent emotional overtones" (Broadbent, Bunt, and Jencks 1980, 80). Le Corbusier and Walter Gropius attempted to establish a universal language based on iconic signs, namely the International Style, but the iconic signs were too restricted and needed more clues for accurate decoding. An indexical sign is one that is an indicative component in architecture. For example, a window indicates a view. These are literal signs that are learned over time by the perceiver through continuous exposure. A symbolic sign is composed of an arbitrary relationship. A bank incorporating Greek columns in its facade is communicating a sense of power and prestige. Certain building materials have become symbolic of building types, such as using glass and steel for an office complex. Most architectural signs are incorporating all three (the iconic, indexical, and symbolic relationships), with one dominating.

Architectural signs are also similar to linguistic signs in that they possess denotative and connotative meanings. The denotative meaning of an architectural sign is its function. Umberto Eco has explained this phenomenon as not only a "codified connection between the form and its function, but also a conventional conception of how one fulfills the function with the form"

(Broadbent, Bunt, and Jencks 1980, 21) . The denoted meaning is not as prevalent as it is in linguistics. If a person can not comprehend the function of the architecture based on its form, then the denoted meaning is not clear. A primitive man would not understand the function of an elevator unless he understood the codification of its form. An unfamiliar architectural object must contain indications or clues for decoding its function in order retain its meaning.

The connotative meaning of an architectural sign resides in the ideology of the function, along with its functional utility in society and any symbolic references or uses that accompany the sign. An example of this could be the throne or chair of a king. Its denotative meaning is an object on which to sit. Its connotative meaning is a chair sat upon by those of high ranking, so the typical individual would think twice before sitting on the throne based on its social connotations.

Once an architectural sign can be identified, its overlying codification system can be analyzed. Umberto Eco has established three types of codes in his essay "Function and Sign: The Semiotics of Architecture". The first type of code is technical. These codes stand for the structural functions of architecture, such as beams, flooring systems, columns, concrete elements, and insulation wiring. The second type of code is syntactic. These codes deal with spatial types, such as a circular plan, labyrinth, and high-rise, and with syntactic conventions, like the fact that stairs do not lead into a window and that a bathroom is next to the bedroom. The third type of code is semantic. This code indicates significant units of architecture and the relations between them. Four different kinds of semantic codes exist: denotation of primary functions (roof, stairway); connotation of secondary functions (triumphal arch, tympanum); connotation of ideologies of inhabitation (dining room, parlor); and on a large scale, the functional and sociological aspects (hospital, school, station), (Broadbent, Bunt, and Jencks 1980).

The codification of architectural signs is already established through standardized messages. Verbal language, however, can generate endless combinations of meanings among

signs. People experience architecture as a form of mass culture, subconsciously attuned to the standardized codifications. At times, though, the semantic functional codes of architecture can be altered by a person without he or she realizing it. For example, an acceptable use of an elevated train can be shelter from heavy precipitation, but a person would not subconsciously use a religious cloth for dusting furniture.

Umberto Eco also defined three types of spatial codes that fall under the area of proxemics, which is standardized through perceived social reality. These codes are directly related to culture, whereas the technical and syntactic codes are indirectly related. (The semantic codes are somewhat directly related to culture). The first spatial code is fixed-feature space. This includes the plans of cities and codified spatial configurations. Japan numbers its housing units by date of construction, as opposed to the American's numbering by location. Also, Japan organizes its cities by defining intersections and not streets. The second spatial code is that of semifixed-feature space. This includes moveable elements of interior and exterior space. In Germany, a closed door of an office does not indicate "do not disturb" as it would in the United States. The third spatial code is that of informal space, which could also be described as personal space. This space varies from culture to culture. Americans require a lot of personal space as compared to someone living in the Middle East. Eco described how these spatial configurations are incorporated into architectural signs and culture: "the architectural form (spatial configuration) becomes the sign vehicle of a possible function (spatial distance between people), which in turn is a sign-vehicle of a social value" (Broadbent, Bunt, and Jencks 1980, 55).

Charles Jencks developed a categorization of codes based on content and expression, which can be applied in conjunction with Eco's categorizations. He developed seven codes of content: 1. way of life sign, which encompasses ethnic domain, inhabitation, and comfort; 2. building activity sign, which includes historical process of change and personal involvement; 3. sign of traditional ideas and beliefs, mainly iconography; 4. sign of functions,

the architecture's use and social activity (like a church); 5. sign of socio-anthropological meaning, mainly proxemics or the spacing of the city and building which articulates social and economic life; 6. economic class, such as the location of your home (status); and 7. psychological motivation, such as phallic or sexual codes.

Jencks also developed three codes of expression which fall lower on the hierarchy compared to the codes of content. The first one is spatial manipulation, which was originally mentioned by Eco. Jencks classifies this type as more expressive than Eco's, stating that nowadays people notice surface features before they notice spatial manipulations (Broadbent, Bunt, and Jencks 1980). The second code of expression is surface covering, which includes the many levels of rhythm, color, texture, proportion, etc., that exist on a surface. The third code is that of formal articulation. This consists of the architecture's three-dimensional shape— its volume, mass, and density.

As can be seen, there is a wide variety of codification systems within the field of architecture, yet most of these systems are fixed. Not much room is available for manipulating or altering the meaning behind a sign. A building itself is a communicating entity. By interpreting the messages of the building, people are able to understand its significance and its role in society. Geoffrey Broadbent, who wrote the essay "Building Design as an Iconic Sign System," has determined that four types of building designs exist, namely pragmatic, iconic, analogic, and canonic. A pragmatic design is one that has a pre-history origin, and is built out of available materials found or created on the earth. An iconic design or typologic design is one where the designer accepts existing building designs as the best possible solution and uses the materials available at a particular place. An analogic design is one that draws upon analogies and incorporates them into existing building designs, possibly using forms from nature, painting, biology, physics, etc. For example, Le Corbusier incorporated a crab-shell roof into his building at Ronchamp. The last design, canonic, is developed from a two or three dimensional geometric system, like the Egyptian canon or the Greek proportions.

A building, thus, incorporates technical codes, spatial codes, forms of expression, and sociological functions, all of which, in one way or another, are influenced by cultural standards. Culture also determines linguistic structure and behavior. Architecture, therefore, records the behavioral patterns and orientation of a culture (Fawcett et al. 1984). Both architecture and written language are devices for storing information. Also, when someone speaks, people listen for cues of voice patterns, body movements, environment, and costume to determine how to react or behave, just as people perceive cues in the built environment to determine behavior (Fawcett et al. 1984). All of these signs and codes eventually determine how a person interprets reality. Donald Preziosi, who wrote the essay "Relations Between Environmental and Linguistic Structure", described reality as:

> realities are the creation of the nervous system; models of possible worlds, which enable the nervous system to handle the enormous amount of information it receives and processes.....the creation of the self involves the construction of reality which is hierarchicalized from the perspective of the individual (Preziosi 1984, 62-63).

Discussion of signs in the field of graphic design

Individuals not only construct reality from language and architecture, but from visual information as well. The world of graphic design employs signs and symbols as devices for communication. Symbols are designed to represent abstract concepts of reality. Designers are able to develop a visual language of symbols that can be used in place of written or verbal language, and they can also supplement the signs of architecture to increase the impact of its message.

The first recorded use of visual symbols occurred during the time of the Lascaux Cave paintings (15,000 B.C.). The cave people drew the figures as a fearful reaction to the supernatural, for survival reasons, and by natural instinct. Later these pictographs developed

out of speech and gestural movements. It was not until the fifth century B.C. that the

Sumerians used pictographs to record dates, objects, and actions. These pictographs were

very simple and stylized, with only a few abstract signs in the collection. The main purpose

behind recording this information was for transport and storage. The Sumerians wrote their

information using cuneiform, or a wedge-shaped impression into a clay tablet. Their language

consisted of about two thousand pictographs.

The Egyptians were the first to develop a phonetic writing system or speech fixed

signs, in which symbols stood for words and sounds and not objects. Their symbols became

somewhat abstract and the system itself consisted of twenty-four signs. The Sumerians and the

Egyptians were both able to develop pictorial languages understood by their cultures. Other

cultures to follow would develop similar systems until the Phoenicians established the writing

system that would later be adopted and enhanced by the Greeks and Romans.

In order to develop a pictorial language system, one must understand how signs are

defined within the field of graphic design. Rudolf Modley, who wrote the book Pictorial

Symbols, determined three types of signs: iconic, image-related, and abstract or arbitrary

symbols. Iconic signs are "simplified reductions of objects or concepts" (Modley 1976, v).

Image-related (or index) signs are somewhat abstract. They have a visual relationship with

the objects, usually in terms of physical characteristics. For example, two wavy lines represent

water. Abstract or arbitrary symbols have no visual relationship with the object or concept.

These are usually such symbols as letters, numerals, punctuation marks, and math operations.

Adrian Frutiger elaborated these three types even more by defining the visual

parameters of the signs. The iconic signs are natural shapes of the object, usually in the form

of a silhouette, and meant to be understood by all (Frutiger 1989). An example of this would

be the sign for a telephone or a coffee cup. The image-related signs are not recognizable at first,

requiring mental effort of the viewer. These signs are usually a combination of elements.

The abstract signs are just that—abstract. These require learning, but once the sign is learned

it becomes ingrained.

Designing a pictorial sign is based on the goal of creating a vehicle for communicating a message clearly. A sign should be simple, incorporating only the essence of the object's shape so that it can be understood quickly, and not require great lengths of thought. A sign should also be independent of a particular culture if it is to be understood by varying cultures. But still, "to identify an object means to recognize some of its salient structural features" (Arnheim 1969, 140). This refers back to the discussion of the primitive man trying to acknowledge an elevator. He has never seen one before, so he will never understand its function or the message it is trying to communicate. Arnheim indicated in his book Visual Thinking, that "the specificity of an image...calls for correspondingly specific knowledge in the person who is to understand it" (Arnheim 1969, 142).

In time, some signs become so ingrained by constant exposure that the meaning of the sign is dependent upon the established arbitrary relationship. For instance, the male and female stick figures used as an indication for a restroom are only understood by those who are familiar with the established association between the symbol and the concept of a restroom. A primitive person or a foreigner not familiar with this relationship would not understand the meaning of the sign. It is in this way that signs can become an indication of a culture and how that culture perceives reality.

The signs of graphic design incorporate similar qualities of semiotics that language and architecture incorporate, yet these qualities are rarely discussed in the research. The three types of signs, icons, indexes, and symbols, are also found in graphic design, but their terminology within this field is not standardized as it is in linguistics. All three of the areas (language, architecture, and graphic design), do define the three types of signs based on similar concepts. An icon is established through the relationship of similarity; an index is established through the display of part of the whole; and a symbol is based on an arbitrary relationship.

Literature in the field of graphic design fails to discuss the importance of denotative meaning versus connotative meaning. The denotative meaning should take precedence over the connotative meaning, for the denotative meaning crosses cultural boundaries and should be understood by varying cultures. By focusing on a connotative meaning in a sign, the designer should be aware of the cultural implications of such a choice.

A graphic designer should also choose highly motivated relationships when developing a sign. These relationships are more direct and less arbitrary, and therefore have a higher possibility of being understood by a variety of cultures. This is only true, however, if the sign is not a key symbol of a culture or it is not the connotative meaning of a culturally influenced concept.

As with pictorial signs, the comprehension of a sign is dependent upon the perceiver's recognition of the sign's form. Most of the time, the form of a sign is an object or concept that has been removed from its original context. The original context of the sign may need to be reinforced if it is to be understood, just as when creating a metasign in linguistics requires the reinforcement of the original sign for comprehension.

Designers who develop signage systems need to consider the aspects of both linguistics and architecture when designing the system. Codification occurs in both areas, and many of these codes are directly related to the culture of the community. By understanding how semiotics influence the way individuals perceive their world, in both language and architecture, then the designer could incorporate this into his or her codification of signs that would explain how to navigate within a public building. Each person develops their own individual social reality through the influence of the their environment, or their culture. The standards of their culture become accepted norms that the individual will subconsciously absorb and allow to influence his or her actions and behavior. Whether designers absorb these influences and realize that they are culturally biased will determine how successfully that designer's signage system can guide the individual to his or her destination.

Perceiving the environment

The interpertation of meaning that one makes of an environment will depend upon that person's cultural influences. But interpreting the environment also means determining its spatial orientation, such as how elements are spatially interrelated in order to navigate through the environment. In the process of wayfinding, people must perceive various aspects of their environments in order to locate their destinations. It is the responsibility of architects and graphic designers to design functional buildings and signage systems that aid users while wayfinding within the building. Many times, users become lost or disoriented, blaming themselves for not comprehending the building well. People in a different culture have even greater possibilities of becoming disoriented in a foreign country. If designers knew the process of wayfinding from a psychological perspective, they might better understand ways of increasing foreigner's abilities to locate their destinations. Current research in the area of spatial orientation has shown that a person's cultural environment can influence his or her ability to develop cognitive maps. This part of the thesis shall describe the process of cognitive mapping and how it is incorporated into a person's wayfinding ability. This part will also discuss current research on how culture influences the development of cognitive mapping skills. Lastly, this part of the paper will indicate design techniques that architects and designers can incorporate to facilitate the wayfinding process.

The process of cognitive mapping

Downs and Stea, in their book Image and Environment, describe cognitive mapping as "a process composed of a series of psychological transformations by which an individual acquires, codes, stores, recalls, and decodes information about the relative locations and attributes of phenomena in his (or her) everyday spatial environment" (Downs and Stea 1973, 9). The key concept behind this definition is that cognitive mapping is an individual process of perceiving the environment. Locations and attributes of phenomena will only be stored by the

perceiver who denotes importance. Arthur and Passini in their book <u>Wayfinding</u>, define a

cognitive map as a "representation people have of their surrounding environment" (Arthur and

Passini 1992). The map is formed through an integration of different vantage points to form

a complete picture of the environment. Being able to perceive one's surrounding is ultimately

dependent upon how well the environment communicates itself. The legibility of primary

features of a building, for example, is crucial. The communication of the entrance and exit is

necessary for regular usage and vital for emergency situations.

Perceiving the environment progresses in three stages (or types of knowledge) that

eventually produce a cognitive map of the surroundings. The three stages, in order, are

landmark knowledge, procedural knowledge, and configurational knowledge. Each stage

builds upon the previous stage; however, the time lapse for the progression varies depending

upon the complexity and the amount of information available on the surrounding environment.

The first stage is that of landmark knowledge, sometimes referred to as declarative

knowledge. This knowledge is composed of "information about the visual details of specific

locations in the environment" (Pick and Acredolo 1983, 196). This is the simplest level,

dealing with such knowledge that "A" building exists, it has "B" characteristics, and is in "C"

location. These facts are usually stored as perceptual icons or images. The formation of this

knowledge is established through direct or indirect viewing and experiences.

The second stage is that of procedural or route knowledge. Reginald Golledge

describes this knowledge in his essay "Cognition of Physical and Built Environments" as:

> Knowledge (that) requires an ability to order or sequence information about
> location cues and distance segments connecting those cues, and ability to evaluate the
> temporal dimension of navigation, and ability to determine direction and orientation
> with respect to previous and consequent route segments and to a general frame of
> reference, and an ability to estimate the nature and severity of barriers that might occur
> along any given route (Golledge 1991, 47).

This knowledge builds on landmark knowledge by encoding or linking the spatial relationship between two points, which can result in movement or behavior in relation to a route. The knowledge becomes a factor at decision points while wayfinding, for it allows the user to rely on stored route information. Much of procedural knowledge is acquired through increased familiarity with the surroundings, such as through direct navigating experience, through maps, or through discussions with other people.

Scott Freundschuh, in his essay, "The Effect of the Pattern of the Environment on Spatial Knowledge Acquisition" describes the final stage, configurational knowledge, as knowledge that "threads together route knowledge to form a network between several places" (Freundschuh 1991, 171). This knowledge level incorporates euclidean distances (straight-line) and directions integrated with experiences. The cognitive map is based on coordinate systems, like a conventional map. This knowledge is sometimes referred to as "survey" knowledge because a person develops a physical map within his or her mind in which they can survey information on a route or alternate route, or any knowledge stored from the previous levels or stages. Currently, the transition process from procedural to configurational knowledge is unknown.

Influences on spatial knowledge acquisition

A person's acquisition of spatial knowledge is influenced by numerous factors, such as how well a building is designed or their cultural background. Arthur and Passini have stated that a building is most remembered by the uniqueness of its form, the amount of visibility within and around the building, how accessible it is, how often it is used, and how symbolism is applied (Arthur and Passini 1992). Garling, Book, and Lindberg, three psychologists who have researched the area of spatial cognition, have categorized these characteristics into three physical setting variables that affect a person's wayfinding ability: the degree of differentiation, the degree of visual access, and the complexity of the spatial layout. The degree of

differentiation is defined as "the degree to which different parts of an environment look the same or different" (Garling, Book, and Lindberg 1986, 58). This variable has been shown to affect both newcomers and users who are familiar with the building. The architect or designer could vary the size, form, the style of architecture, color, etc. to enhance a person's wayfinding abilities. The degree of visual access is defined as "the extent to which different parts of the environment can be seen from other parts" (Garling, Book, and Lindberg 1986, 58). The more visibility a person is allowed, the more he or she is able to recognize or locate distant destinations and be able to maintain orientation with greater ease. The complexity of the spatial layout is defined as being "related to the environmental size, ...the number of possible destinations and routes, and whether the routes intersect at right angles or not" (Garling, Book, and Lindberg 1986, 58). The more simple the layout of the building, the easier it is for a person to make decisions regarding routes, to maintain a sense of orientation, or to absorb new information about the environment.

Other factors can play a role in acquiring spatial knowledge. Variations occur as to the amount of information used in navigation, for one person may utilize signs, architectural cues, and maps, whereas another person may just rely on signs. Also, a person's spatial cognitive abilities develop based on experience, so users will vary at levels of experience. For example, one person may be quite familiar with the layout of hospital buildings and be able to navigate in a new hospital, but a person who has never been in a hospital might have a difficult time navigating. A study by Moshe Naveh-Benjamin on the coding of spatial information has demonstrated that the encoding process is not an automatic process by using two different groups of subjects, one group composed of students from a department with highly selective criteria for admission and a second group composed of students from a liberal admission criteria. The highly selected group encoded the spatial information better that the liberally selected group; however, if the encoding process was an automatic process, then both groups would have encoded similarly. Therefore, experience does play an important role in developing

a person's spatial cognitive abilities based on this data which shows that not all people perceive and encode information in similar ways.

Experience is directly related to cultural context, for "culture, through socialization process, helps to determine which aspects of perceptual objects are to be attended to and how the percepts are to be organized" (Triandis and Brislin 1980, 354). A person's knowledge base is constructed by his or her cultural context. The culture "provides the conceptual matrix that encompasses experienced information" (Garling and Evans 1991, 43). Mary Gauvain has researched the sociocultural influences on the development of spatial thinking, based on the premise that all people "possess the same basic processes of psychological functioning", but their participation with a culture directs the development of these processes (Gauvain 1992, 28).

A person participates in a culture through the use of its conventions, tools and practices. "It is through the use and application of these cultural products that individuals develop their thinking skills" (Gauvain 1993, 100). One product of a culture discussed by Gauvain is a communicative convention, which includes such concepts as the way a person describes large-scale space in terms of route descriptions. Gauvain cites a study that resulted in Iranian children providing more descriptive accounts of sites along a route but less directional information than British children. The reasoning for this is that the availability of tools in the two cultures differs, thus altering the way the children structure information. The British children are more accustomed to using tools such as pencils, paper, and maps (tools that directly incorporate direction when describing or drawing the route). Gauvain also stated that studies have shown that an increased accuracy in spatial domains, like distance estimation, model replication, and map use, "is related to experience in school and in a culture that values and promotes measurement and precision, as in the case in Western cultures" (Gauvain 1993, 109-110).

Actions plans of wayfinding

Spatial knowledge is thus a vital component of a person's wayfinding abilities. Wayfinding has been described by Arthur and Passini as "spatial problem solving", which consists of decision-making and decision-execution processes, both of which are based on the person's perception of the environment (Arthur and Passini 1992). Most settings are designed so that a person can form a plan of action that will transfer them from their present location to their destination. If the setting is not designed in such a way, then people are unable to form a cognitive map within their action plan and must rely on alternate methods, such as "wandering about". In order to form a cognitive map of a building, a person should be able to identify distinct spatial entities of the setting. When an entity is identified, the execution of the decision plan occurs (Arthur and Passini 1992).

However, before execution can occur, an action plan must be formed. During the decision-making process, most people structure their plan hierarchically from general to specific behavioral decisions, usually not more than four decisions at a time. Some level of a cognitive map is developed as an action plan and much of this formation relies on the amount of information available in the setting and the person's familiarity with the setting.

Three types of information about the setting are obtained for planning spatial behavior: sensory information, or information absorbed at that moment; memory information, or stored information from past experiences; and inferred information, which is a combination of both sensory and memory information (Passini 1984). Sensory information is perceived based on the attentiveness of the perceiver, usually by scanning and glancing. The perceiver selectively attends to the messages that relate to his or her development of an action plan. A person forms or retrieves a cognitive map when incorporating memory information into their action plan. For the formation of a cognitive map of the setting, a person will rely on such devices as you-are-here maps, building directories, and architectural components (visual accessibility, exterior

form, etc.). The more familiar a person is with the setting, the more complex and configurational the map becomes. The cognitive map is stored in long-term memory once it is formed and short-term memory is acquired for the encoding, recoding, and decoding of the map (Garling, Book, and Lindberg 1984). The action plan is based on the linking of this internal information processing to possible actions and behaviors. Once stored, a cognitive map may later be recalled in an unfamiliar setting for a prototypical action plan. The cognitive map, or schema, aids in behavioral decisions by providing relations among items (like telephones being located near restrooms) and an overall layout of that type of building (Garling and Evans 1991).

The decision making of the action plan formation is a conscious process, whereas the execution of the action plan is not, for "the process of executing decisions is largely based on recognition" (Passini 1984, 73). Once the expected object in the sequence of the action plan is perceived then action occurs. If the expected object is not perceived, then the execution of decisions reverts to a conscious decision-making process. During decision executions, the perceiver stores an expected element in the cognitive map to perceive at some point during navigation, and then matches the element once it is found. These elements are stored in long-term memory in a hierarchical structure, along with additional elements perceived while navigating through the building. Garling, Book, and Lindberg summarize the entire process of developing and executing an action plan in Figure 1 (Garling, Book, and Lindberg 1984). Figure 2 diagrams the executing of decisions during the wayfinding process (Passini 1984).
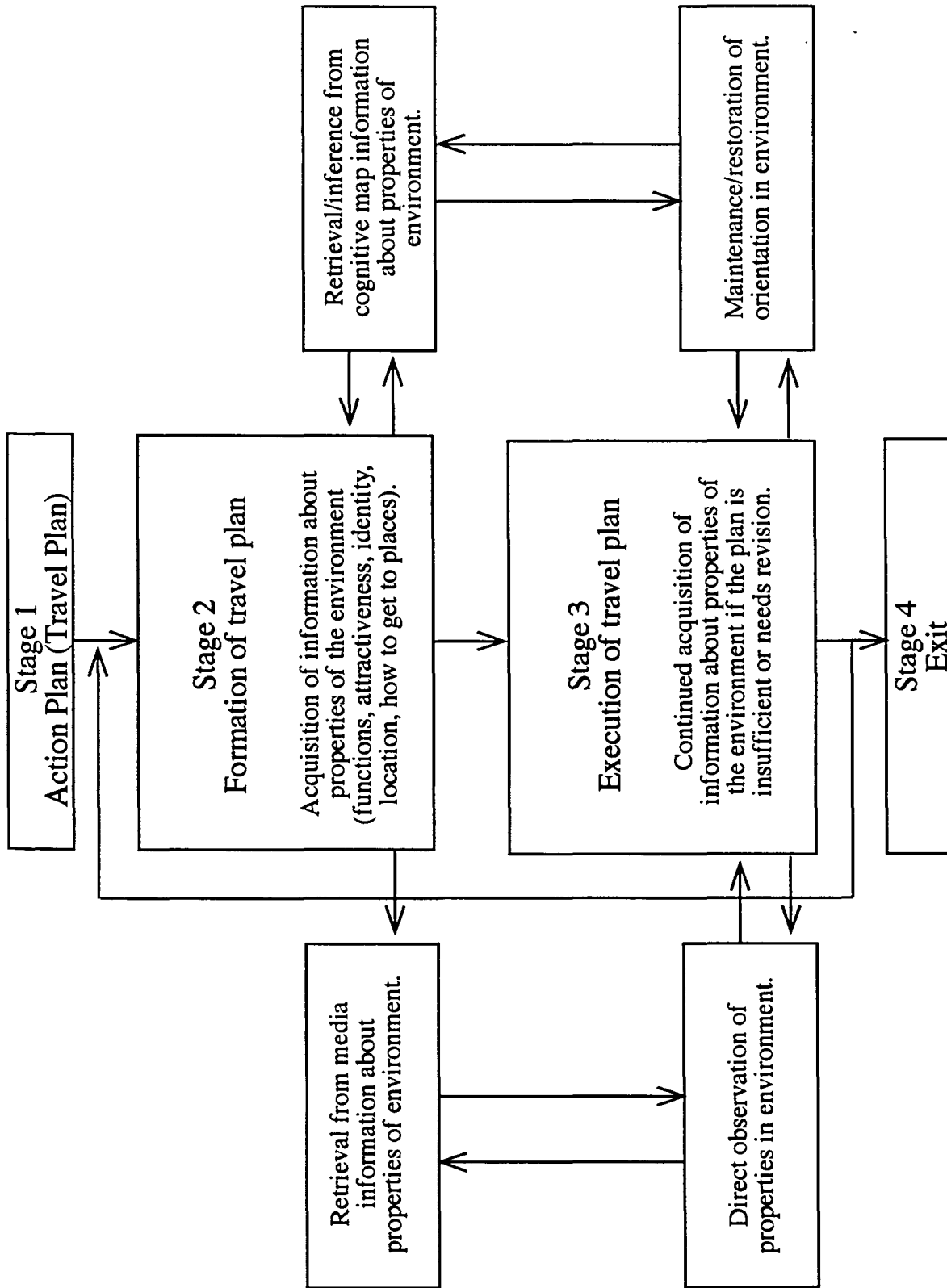
Figure 1. Process of developing and executing an action plan (Garling, Book, and Evans 1984)

D n+1

subsequent
decision for
execution

B OVERT
BEHAVIOR

execution of
behavior

I ex = I pe

IF

D n

I ex
EXPECTED
IMAGE

execution of
behavior

I pe
PERCEIVED
IMAGE

matching expected and
perceived image

B
PLANNED
BEHAVIOR

IF

I ex ≠ I pe

D m
NEW PLAN
AND
DECISION

new alternative
ready for
execution

decision
making

T DECISION
BECOMES TASK
AND PROBLEM

no execution
of behavior

Figure 2. Process of executing decisions during wayfinding (Passini 1984)

Design techniques used to aid in wayfinding

"Both decision making and decision execution require environmental information. To provide this information at the appropriate place is one of the most important aspects of wayfinding design" (Arthur and Passini 1992, 33). To successfully build a cognitive map of a setting will depend on the clarity of the setting's spatial organization. Harry Heft, who researched the role of environmental features in route-learning, found that "subjects rely on characteristics of the environment when learning a route through an unfamiliar setting" (Heft 1979, 184). These characteristics include landmarks, typography of the area, and characteristics of the path. An environment that does not communicate these features well will cause the person to become disoriented and unable to form a cognitive map for wayfinding.

The descriptive components of a city in Kevin Lynch's book, The Image of the City, can be an effective tool when developing an efficient wayfinding system. Lynch categorized the formal elements of a city into five areas: paths, edges, districts, nodes, and landmarks. Paths are defined by the channels of movement. They are dependable if they maintain track continuity (in materials), spatial continuity (width), and the locations of destinations are clear. Misalignment with a path usually occurs because of an unperceived gradual change in direction or because the path is removed from its elements and no clues are provided of its orientation, like a subway path. Edges are the boundaries of different sections within a setting. They can be important in communicating when one section of a building is ending and another one is beginning. Districts are defined by thematic continuities of physi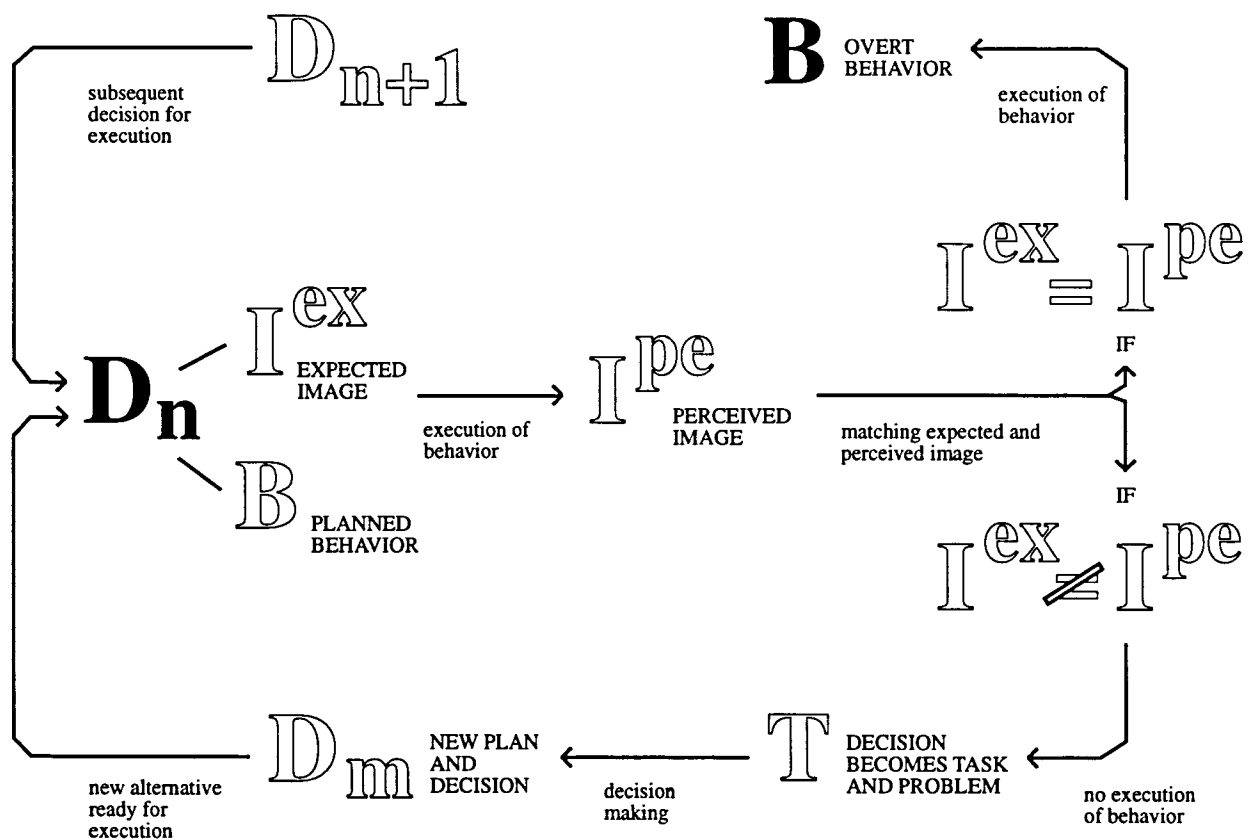cal characteristics such as "texture, space, form, detail, symbol, building type, use, activity, inhabitants, degree of maintenance, and typography" (Lynch 1960, 67). Nodes are the location of decision points or junctions, which are also referred to as anchor points in cognitive maps. Landmarks are known to be effective anchor points, for a landmark located at a junction will cause both to be more memorable. People are known to rely on landmarks for guides while wayfinding, especially since they are the basic structure to a cognitive map.

Jan Carpman, who wrote a book on designing hospital complexes called Design That Cares, has stated, "Moving through a building that has a sufficient number of landmarks, views to the outside, and easily differentiated spaces can result in an understanding of the overall structure of the building and the interrelationship of its constituent spaces" (Carpman 1986, 61). By incorporating the formal and psychological qualities of paths, edges, districts, nodes, and landmarks into a design that will utilize the three key physical setting factors (differentiation, visual access, and spatial layout complexity), the building will facilitate an understanding of the spatial organization and thereby allow the user to locate his or her destination in an efficient manner. In the area of spatial layout complexity, studies have shown that subjects tend to make more errors while wayfinding as the complexity of the spatial layout increases (O'Neill 1991). The more complex a layout is, the more memory required to store the information in the cognitive map. Jerry Weisman also performed a study where the floor configurations proved to be strong predictors of wayfinding behavior. "Simplicity judgments (of the floor configurations), provided by a group of independent raters, were able to account for 56% of the variance in reported frequency of disorientation data" (Weisman 1981, 201). However, simplicity can cause disorientation if the layout is symmetrical and undifferentiated. A person would not be able to form a cognitive map efficiently if all of the corridors were undistinguishable. Entrances and exits are two other areas that need high emphasis and distinctiveness in complex settings.

Distinctiveness is also important in destination zones, for this aids in the decision making process and in the formation of cognitive maps (Arthur and Passini 1992). The zones will be differentiated from each other, yet each zone will have common characteristics. A higher degree of visual access allows the user to comprehend the layout and observe the differentiation with greater ease. An atrium, for example, would allow the user to locate possible anchor points or destinations with greater ease than a small, enclosed entryway.

Also, the external form of the building could provide clues to the internal organization and circulation system.

The physical characteristics of a setting are at times substantiated with a signage system. A signage system can reinforce the architectural design, but some signage cannot overcome the areas lacking in design (Garling, Book, and Lindberg 1986). Complex signage systems may be uneffective in settings that contain a large number of destinations, like a shopping mall. Arthur and Passini have classified graphical information into three functional information types: "orientation and general information about the setting," such as maps, floor plans, directories, and safety information; "directional information to destinations," such as signs with arrows, floor directories in elevator lobbies, and colored lines on walls; and "identification of destinations," such as signs with names or pictographs, safety colors with equipment, and signs showing local hazards (Arthur and Passini 1992). The orientation and general information is information used during the decision-making stage; directional information and identification information are those which aid in the decision-executing stage. The information contained on each sign should be legible and comprehensible, and also structured in a way that will reduce information overload. Signs that are illegible, incomprehensible, and create confusion in meaning will cause more problems for the user than if the signs were not incorporated into the system at all. Signs can also create problems if they are ambiguous, conflict with information on another sign, deficient in providing information, create glare from their materials, provide inaccurate information, or are unreliable (Arthur and Passini 1992).

In order to develop a legible and comprehensible signage system, a designer must analyze the type of information to be conveyed and decide whether text or symbology or both should be incorporated to communicate the information. O'Neill's study on the effects of signage and floor plan configuration on wayfinding accuracy revealed that textual graphics are best when time is not a factor in processing information, and that symbolic graphics are best

when time is a strong factor and accuracy in behavior is less important (O'Neill 1991). His

subjects made more errors in behavior (such as the amount of backtracking and wrong turns)

when following signs consisting only of symbols. Arthur and Passini have observed that most

designers prefer to use text and symbols together. Using both of these can help to solve

bilingual and illiteracy problems. Otto Neurath, the designer of a proposed universal language

called Isotype, once stated, "Pictures, whose details are clear to everybody, are free from the

limits of language: they are international. WORDS MAKE DIVISION. PICTURES MAKE

CONNECTION" (Jacobs 1991, 45). However, symbols can sometimes cause more

confusion. A designer should consider these guidelines outlined by Jan Carpman for the use

of symbols in signage: test symbols for comprehension; be consistent with style, color, shape,

and background; limit the number of symbols used; use only one symbol per message; use the

symbol only by itself if it is already widely accepted; and do not use arrows with non-

directional signs (Carpman 1986).

Another area of concern is the terminology of the textual graphics. When labeling

destination zones or departments of a building, it is important not to use Latinate vocabulary

such as "radiology", and instead apply plain language terms such as "x-ray" or "down the

stairs". Arthur and Passini suggest treating floor and room numbering systems like an

American city. The floor is considered part of a town, the corridor is considered a street, and

a room number is considered an address with odd and even numbers on opposite sides (Arthur

and Passini 1992). Numbers also work well because they are multi-lingual.

You-are-here maps are another device used by designers to facilitate the wayfinding

process. Arthur and Passini report that people prefer stylized maps for interior settings, and

that it is important to show information only where it is needed and not all at once. For

example, all floors of a building would not be displayed on the ground floor (Arthur and

Passini 1992). Jan Carpman has listed seven effective design techniques for you-are-here

maps: the labels on the maps should correspond to the signs on the wall; it is best to place the

map near an asymmetrical part of the building so users will be able to identify some feature of the environment; align the map in accordance with the layout of the environment; incorporate landmarks into the map; simplify the map area; draw arrows indicating where the person is located; and show insets indicating mapped portion in relation to the rest of the building (Carpman 1986). The alignment of the map is a key criteria, for a study by Levine, Marchon, and Hanley has demonstrated that misaligned maps will mislead people, even if they are informed of its misalignment. Users will assume vertical maps are aligned and will move in the wrong direction. The researchers stress that it is important to "choose the location first, then design the map" (Levine, Marchon, and Hanley 1984, 157).

Summary

Designers who carefully consider the needs of the users that a setting may facilitate are those who will implement successful signage systems. Based on the research presented, a signage system that does not administer to the formation of route knowledge or a cognitive map will fail to support the needs of its users. The signage system should assist any user, from those who form cognitive maps based on the architecture and you-are-here maps to those who follow the signs until they reach their destination. By understanding the process of cognitive mapping and how it is influenced by a person's cultural background, designer's will be able to develop signage systems that can benefit the various users of the setting. Designers must also consider how architecture plays a role in wayfinding. A well-designed building is one that integrates visual acuity, differentiation, and the complexity of the layout in a way that allows the viewer to absorb the information needed to navigate throughout the environment. This building will also allow users of varying cultures to identify the messages within the architecture when designers focus on the meaning behind the architecture's signs and compensate for any cultural biases.

PROBLEM DEFINITION

The theoretical basis for a successful signage system has been established by the research presented in the first part of this thesis. In order to understand a theoretical basis, it is best illustrated through an application to a practical situation or environment. The defined basis can be applied to various forms of public environments, such as a hospital, a zoo, or any type of space that must communicate its function to a variety of users. Each environment has varying purposes, or events, in which the users' needs are considered the major element in designing the signage system. For example, a hospital environment must provide clarity and ease for obtaining information, for its users may be in a life or death situation that requires reaching a destination with quickness and no uncertainty. This type of user contrasts with the users of a zoo, whose main purpose is to leisurely spend their time observing animals. The signage in a zoo can be much more illustrative and intricate than the signage in a hospital.

The graphic signs in a public environment must also interrelate with the signs of the physical environment or architecture. Each one should reinforce the other for clear communication. If both the door and an exit sign are communicating "this is an exit leading to the outside of the building", then various users will understand the message. A sign using only English language that is reinforced with architecture communicating the same function will allow a non-English reading user to understand the message. For example, a graphic sign displaying the word "nursery" with an arrow pointing forward could be reinforced architecturally by allowing the user to have visual access of the nursery at this point, whether it is a large panel of windows at the end of a corridor showing the cribs inside, or nursery motifs that are integrated into the walls or facade of the nursery. When graphic symbols can not be incorporated into a message to classify it as "universal", the architecture must play a more important role in communicating its function and aid those who cannot understand the

graphic signage.

Methodology

With these concepts in mind, a case study has been developed for the second part of this thesis. The study will involve an analysis of signage in an existing public environment, with the theoretical framework as the basis for evaluation. The analysis will focus on how the graphic and architectural signs interrelate in terms of communicating for various wayfinding abilities. The signs will be defined as to what type of signs they are, whether they are icons, indexes, or symbols. In review, an icon is described in terms of graphics as a silhouette or natural shape of an object (Frutiger 1989); an index is a sign that has a visual relationship with the object, such as its physical characteristics (such as two wavy lines to represent water) or it is a part of the whole object; and a symbol is formed through an arbitrary relationship between the graphic and the concept (such as stick figures symbolizing a restroom). When referring to architectural features, these terms are defined slightly different: an icon stands for the functional aspects of the architecture, or the use of forms and materials according to their function (Broadbent, Bunt, and Jencks 1980); an index is an indicative component, usually a literal sign learned over time; and a symbol occurs when a material is used for a symbolic purpose. If a sign is defined as a symbol in either area, a further analysis will determine if it is a key symbol (culturally defined).

The signs will also be analyzed in terms of their denotative and connotative meanings. The denotative meaning is "the explicit, obvious, straightforward, first meaning of a sign" (Leeds-Hurwitz 1993, 26). In architectural terms, the meaning is the physical function of the form. The connotative meaning is the implicit meaning imposed by a specific culture (Leeds-Hurwitz 1993). For an architectural sign, it is the symbolic references or uses. A sign that is dominated by connotative meaning is one that should be reinforced with a sign that is expressed through the denotative meaning of its function.

While analyzing the site, the degree of denotative versus connotative meaning expressed in the sign will suggest how universal the meaning is and how it might impact the wayfinding abilities of a foreign visitor. This universal nature will also be determined by the amount of motivation that exists, which is how strong the sign illustrates its function, and the amount of convention that exists, which is the amount of learning that occurs for the meaning to become apparent. Architectural signs will also be analyzed in terms of their plane of expression and plane of content. The plane of expression is composed of the physical aspects of the sign, such as its form, space, surface, volume, rhythm, color, and texture; the plane of content of composed of ideas of spatial concepts, ideologies, and social customs (Broadbent, Bunt, and Jencks 1980).

The sign's role in cognitive mapping will also be determined (both graphic and architecture), as to whether it aids users who follow signs until they reach their destination (route learners) or whether it aids those who rely on configurational maps (configurational learners). This will also indicate which knowledge level of cognitive mapping the sign builds— landmark, route, or configurational. Architectural signs will be analyzed for their contribution to visual access of destinations, spatial layout configuration, or differentiation between parts of the public environment.

Lastly, the site will be evaluated for its use of Lynch's wayfinding techniques, those of incorporating and emphasizing pathways, nodes, districts, edges, and landmarks through architectural forms. All of these terms are outlined in Figure 3, which shall be administered during the analysis stage of the case study.

Case study: the Mall of America

The site of analysis for this case study is the Mall of America in Bloomington, Minnesota. The mall was chosen based on its size, its location, its attraction to various users, and the concepts incorporated to aid in wayfinding. The 4.2 million square foot complex was

Graphic Signs

Directional - Look at signs in each area: Parking, Entrance, Directory, Intermediate signs, exits

Procedural - Look at signs in each area: Emergency routes (stairs, elevators, exits)

Content of Sign:

Location: (Physical description)

    Ease of locating: (stand out or blend into surroundings / well-hidden)

    Interaction with architecture: (function of sign correlates with function of architecture)

    Role in cognitive mapping: (geared towards route learner or configurational learner and how)

Semiotics:

    Type: Importance for universal translation (is it a key sign in procedures)

    Graphic:

        Type of sign: (icon, index, or symbol)

            If symbol, is it a key symbol? How?

        Denotative meaning:

        Connotative meaning:

        Degree of motivation and convention: (high or low)

Architectural Signs

Look at signs in each area: Pathways (corridors, stairs, elevators), Entrances, Nodes, Landmarks,

    Edges, Districts, Exits

Description of sign:

Type: (icon, index, symbol)

    If symbol, is it a key symbol? How?

    Plane of expression: (physical aspects)

    Plane of content: (ideas—spatial concepts, ideologies, social customs)

    Denotative meaning: (physical function)

    Connotative meaning: (symbolic function)

Contribution to cognitive mapping: (as visual cues)

    Area sign contributes to:

        Differentiation, visual access, and/or spatial layout complexity

        Route learner or configurational learner or both

Figure 3. Outline for analysis of graphic and architectural signs

built over the original site of the Metropolitan Stadium, home to the Minnesota Twins and
Vikings until 1982. The mall was developed by the Ghermezian brothers, (who also built the
mega mall in West Edmonton, Canada), along with Melvin Simon and Associates of Indiana.
The mall opened on August 11, 1992, and cost more than $650 million to build. The mall has
a rectangular format, with retail shops around the perimeter and in the center is Knott's Camp
Snoopy, an amusement park. The mall is composed of four levels, with the fourth level
consisting of nightclubs, restaurants, and movie theaters. The average walking distance around
one level of the mall is .57 miles. The mall is divided into four sections, each with its own
characteristics: West Market, South Avenue, East Broadway, and North Garden. The four
corners of the mall are anchored by large department stores: Sears, Macy's, Nordstrom, and
Bloomingdale's (see Figure 4). Users of the mall may enter through the north or south
entrances on the first level or through the west or east parking lots on each level. Some key
attractions of the mall include LEGO Imagination Center, Planet Hollywood, and Golf
Mountain (miniature golf).

The mall attracts 600,000 to 900,000 visitors per week (varying by season), with thirty
percent of its visitors originating from outside a 150-mile radius. In 1993, the mall brought in
400 tour groups from Japan. Most of the foreign visitors are from the United Kingdom, Japan,
Germany, and Canada. The mall actually prides itself in its "user friendly" design, for the mall
press kit states, "Each (section) has a distinctively different look, theme and color scheme to
help visitors find their way easily" (Mall of America Press Kit 1994).

In terms of wayfinding, the average user is there to shop or to spend their time walking
leisurely amidst the surroundings. The need for information is not as crucial as it would be in
a hospital. Yet most malls are not this immense in size and the need for signage is more
important than it would be for a one-level mall. David Guterson, a writer with *Harper's*
magazine, spent a day at the Mall of America and commented: "Yet despite the mall's
expansiveness, it elicited claustrophobia, sensory deprivation, and an unnerving
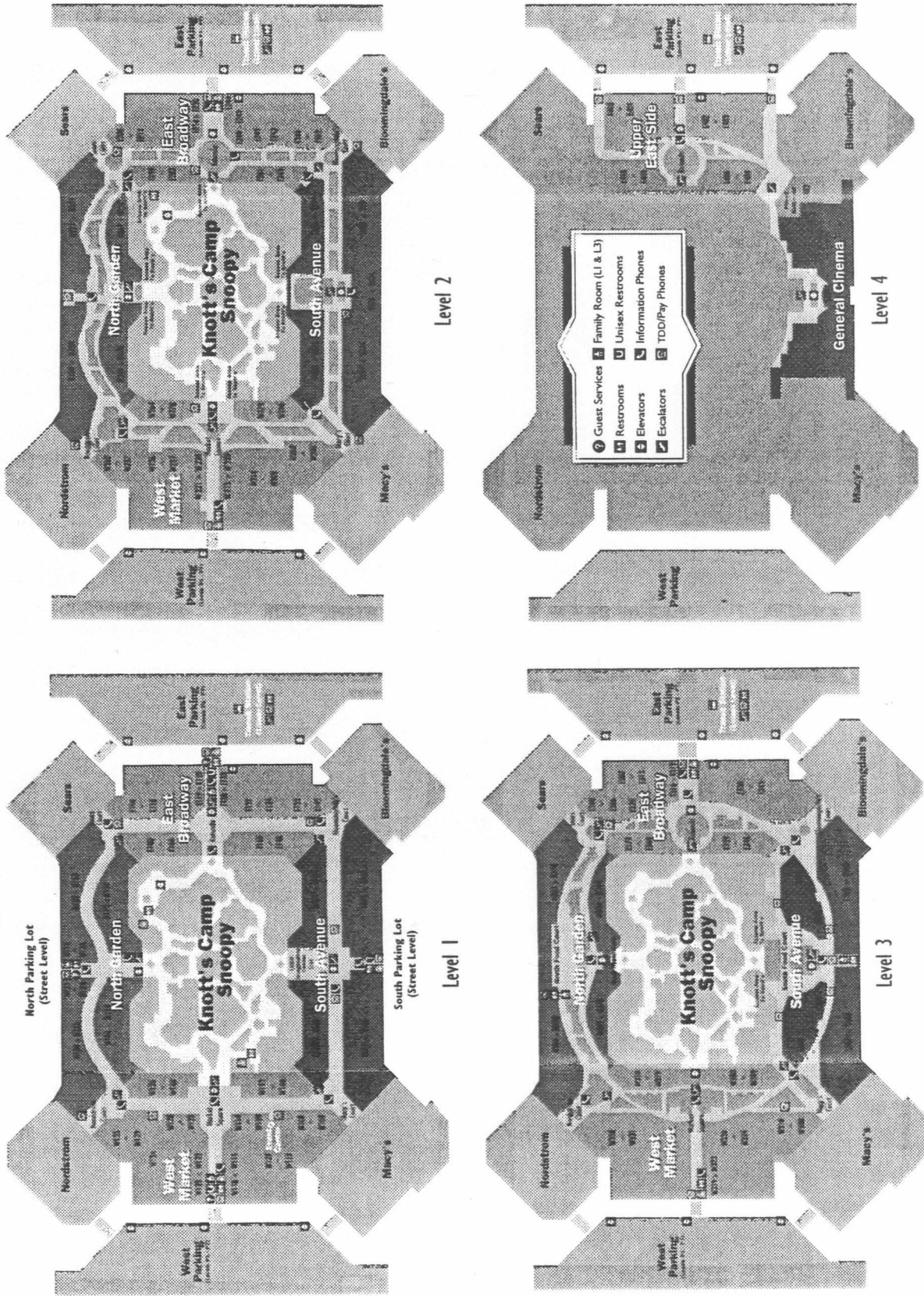
Figure 4. Spatial layout of the Mall of America.

disorientation...(and also had) nothing to distract the shopper's psyche from the alternate

reality the mall conjures" (Guterson 1993, 50). The number of people at the mall can have an

effect on one's perception, however, for trying to navigate through a crowd would cause

anyone to become claustrophobic and disoriented. The amount of time spent at the mall can

also affect perception. Continuous walking and absorbing vast amounts of visual information

can cause disorientation for many users. Some critics believe that mall design can cause

consumers to spend more money. Margaret Crawford, in her essay "The World in a Shopping

Mall" states:

> All the familiar tricks of mall design—limited entrances, escalators placed only at the
> end of corridors, fountains and benches carefully positioned to entice shoppers into
> stores—control the flow to consumers through the numbingly repetitive corridors of
> shops (Crawford 1992, 13).

While all of these factors are important considerations, this case study focuses only on the

interaction between graphic and architectural signs and how the mall facilitates ease in

wayfinding. It does not focus on the behavioral factors, as mentioned above, in the analysis.

Documentation

The documentation of the Mall of America occurred in two phases. The first phase

consisted of obtaining a copy of the directory map or floor plan of the mall, along with a

preliminary visit of the site. The layout of the mall was then divided into sections or districts,

which were then subcategorized into two areas: graphic signs and architectural signs. Graphic

signs that were documented consisted of directional signs, or signs that indicate direction to a

destination; procedural signs, or signs that indicate action during an emergency situation (such

as exit signs); and identifying signs, or signs that identify a room or area. Architectural signs

were documented for the following areas: pathways or corridors, elevators, escalators,

entrances, nodes, landmarks, edges, districts, and exits. All of these areas are those which are

important for facilitating the process of wayfinding in a building. The second phase consisted

of documenting each sign with photography and written comments. A check-list was developed to document which areas were photographed, noting the location of each picture and which roll of film was in use for future referencing purposes. The check-lists are illustrated in Appendix A. Each sign was later analyzed according to the outline in Figure 3, which can be seen in Appendix B.

ANALYSIS

Each area of the mall is composed of strong techniques used to aid in wayfinding, along with weak areas in its design. Some areas have stronger design qualities in which their signs interrelate and communicate a message with more clarity than other areas. The mall's interior court yard of Camp Snoopy is in an environment of its own, completely separated from the retail sections except for the large openings in the central nodes of each section and the smaller openings in the four corners near each anchoring department store. A user within the camp will only observe openings in the walls surrounding the camp as the only visual access to the retail sections. The two environments, the amusement park and the retail shops, co-exist independent of each other. Camp Snoopy was under analysis only for those areas where the two environments were visually juxtaposed.

Parking lots

The first area under analysis is the parking lots, which are quite successful in their design. Upon entering the mall by vehicle, the mall user is directed along roads to one of the two major parking lots—the West or East Parking. The entrance is a long ramp that begins at ground level and intersects each level until it reaches the top level, providing access to each parking level. Once at the top level, the ramp continues back down to the ground level on the other side, forming the shape of a pyramid (Figure 5). The access to each level is identified with colored posts, level names with an accompanying graphic, and "Do Not Enter" and "Enter" signs. The entrance and exit for each level are side by side, and only the "Do Not Enter" sign has a red international symbol for "do not enter", the solid circle with a white horizontal bar through it. The "Enter" sign is white with red type, a color that is symbolic in the United States for "stop", with no international symbol. The entrance is on the right side,

Figure 5. Parking lot ramp viewing towards exit.

with the exit on the left, which are culturally ingrained directions for the flow of traffic.

The architecture is identical for both sides except for the signs above each opening, but the

signs are quite narrow and difficult to perceive. The white lights within the lot can interfere

with the white background of the signs, causing the signs to be incomprehensible. The ramp

into the parking lot is also the exit, comprised of a four lane road facilitating both directions

of movement (see App. B no. 1, 2, and 40).

Each level of the parking lot is color coded and is identified with a state name and

a graphic. The West Parking lot levels are identified with west coast states, such as Nevada,

Arizona, and California. Graphics accompanying each state are characteristic of that state, such

as hip sunglasses for California and dice for Nevada (Figure 6). The East Parking lot levels are

identified in a similar manner by using east coast states and graphics. The graphic becomes a

mnemonic cue for the level of the parking lot, with additional signs (letters) identifying the
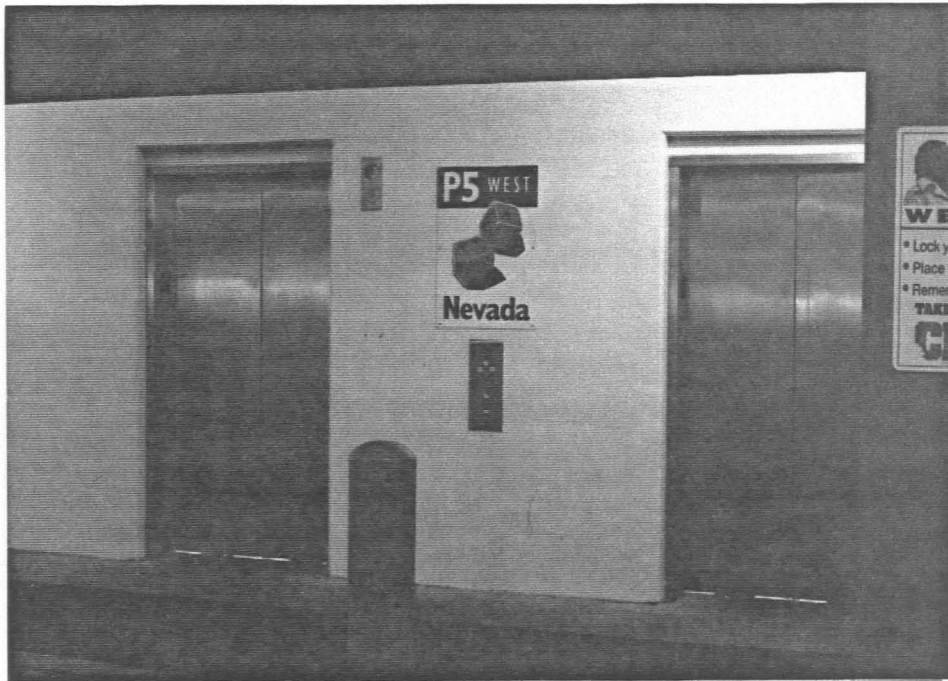
Figure 6. Parking level identification sign.

aisles and numbers identifying sections. Almost every post is color coded for that level of the

parking lot (Figure 7). The graphics are key symbols for the states, such as dice for Nevada,

but the graphic is basic enough that it can still be used as a mnemonic device whether the user

understands the meaning or not. Nonetheless, the connection between the level name (Nevada)

and its graphic (dice) will be stronger and more memorable if the person understands the

connection. The user will have to remember the number of which level it is, however, because

no association was made between the graphic or state name with the level number. A person

parked on Nevada must also recall that it is level five to prevent having to search each level

until they reach one with Nevada and dice pictured on the posts (see App. B no. 3 and 4).
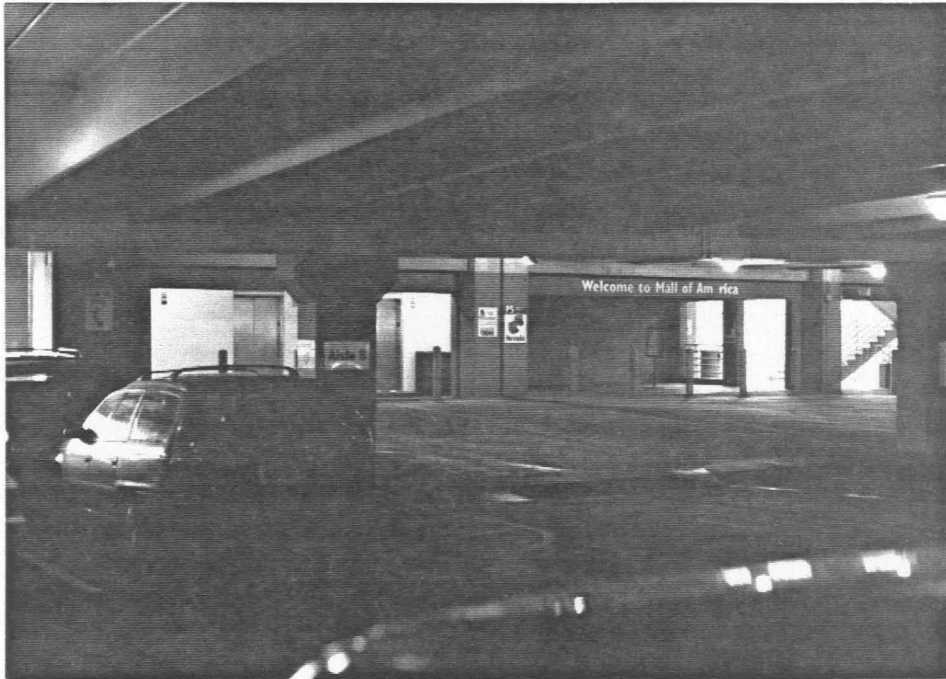
Figure 7. Color coding of the parking lot levels.

Each level of the parking lot is filled with narrow directional signs hanging from the ceiling, indicating directions to the entrance of the mall, the two large department stores at either end, and exit from the parking lot. These directional signs are in English, however, and would not aid a person who could not read English, who must, in turn, rely on the architectural cues

The parking lots aid users quite well, for there are no walls in this environment except the ones created by the elevator and stairs in the middle and at the two corners where the large department stores are located. The natural light directs users to the areas without natural light, which indicates entrances to the mall. The parking lot in itself is a cultural symbol of an American device for stacking a large number of vehicles in one area due to the lack of mass transportation systems like the ones that exist in Europe. The only form of mass transportation in Minneapolis is the bus system, which does have a transit station on the ground level of the

East Parking lot. Minneapolis, however, does not have any subways or elevated trains like those of other major cities and must accommodate the large number of users by providing parking within close proximity of the mall. A user familiar with this concept would have a schema for parking lots and thus find this lot easy to navigate as compared to other parking lots in the United States. The configurational knowledge of previously explored parking lots would aid the user immensely; whereas a user unfamiliar with parking lots would rely on the signs in order to navigate. A user who does not read English would rely on the international symbol of "do not enter" and the architectural cues (such as open area versus walls) to indicate direction. The main failure in communicating to this type of user lies in the undifferentiated entrance and exit to the parking levels.

Entrances

In order to enter the mall from the parking lots, the user must enter through a connecting walkway between the mall and the parking lots. The walkways consist of glass walls leading to four sets of double glass doors, which are typical of mall entrances in the United States in order to accommodate large flows of pedestrian traffic. The use of glass provides the user visual access to the interior of the mall and location of their destination. The glass doors also bring in a large amount natural light, providing an indication of exterior for those inside the mall searching for an exit. Once inside the mall, a large sign in the center of the corridor (which consists of a pathway on each side) identifies this section of the mall, along with its identifying symbol. The first level of the East and West sections also have information services, indicated on the large sign with a question mark, the international symbol for information (Figure 8). A user who does not speak or read English could ask for assistance in this area. The mall will provide interpreters for those who need them. These identifying
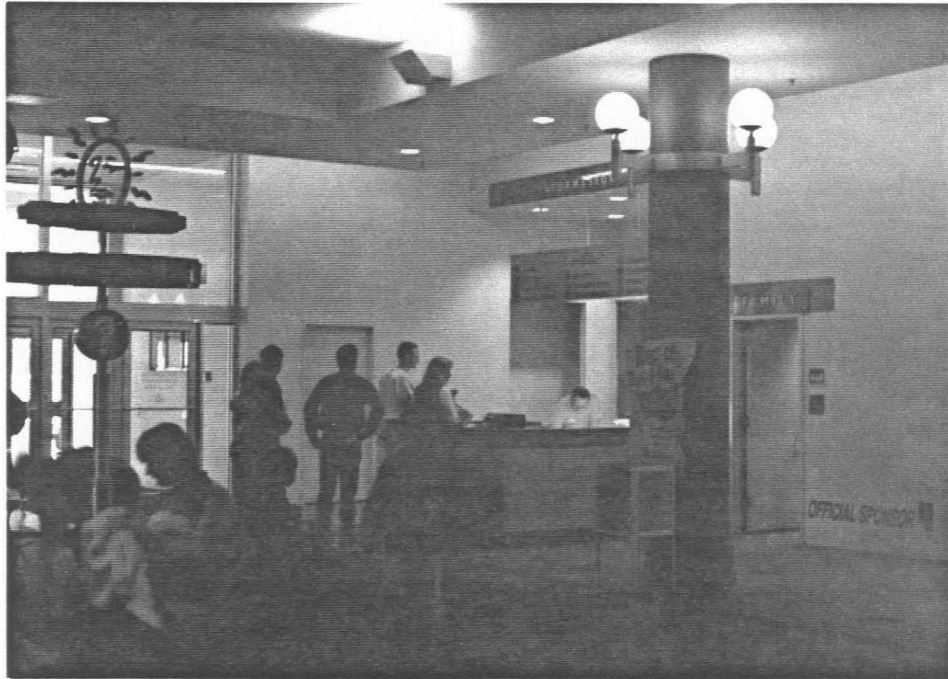
Figure 8. Information services in West Market.

signs, however, are difficult to perceive from the other end of the corridor, for they are surrounded by a conglomeration of visual information. They are not located in the direct path of walking or vision, and the bright natural light from outside the glass doors transforms the sign into a large dark object (see App. B no. 7).

On the right hand wall is a large directory displaying the spatial layouts of all four levels of the mall and the store locations (Figure 9). Each section of the mall is color coded on the maps: West Market is green, South Avenue is purple, East Broadway is blue, and North Garden is dark pink. The four department stores are orange, and Knott's Camp Snoopy is light green. These maps on the wall are the only typographical indication of the level on which the user is located. The third level directory wall displays this as "You are on Level 3" above the layout of the third level (Figure 10). Users must rely on visual cues, such as open atriums, to

Figure 9. Wall directories located near entrances.
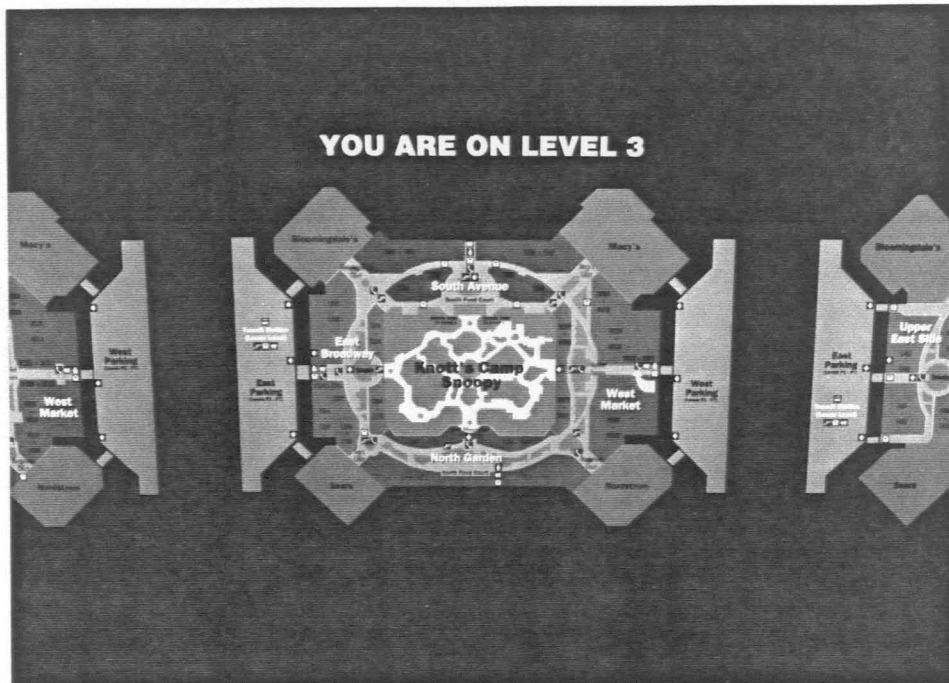
Figure 10. Level identification on wall directories.

determine on which level they are located. At times this causes confusion because only certain levels are visible from varying vantage points.

This entrance area serves both users who rely on route and those who rely on configurational knowledge, for the area creates a point of origin for those who navigate by developing routes, and the directory wall maps provide rudimentary spatial layouts of the mall for those who develop cognitive maps for navigation. Also located in this area are lockers, restrooms, and family rooms (first level only). The restrooms are identified by international symbols, but the family or nursery room is identified with an iconic representation of a family of four—a mother, a father, and two children between them (refer to Figure 8). These signs are placed directly on the wall at the point of location. The family room sign, however, is identified on the directory maps as a baby with diapers, the international symbol for nursery. A user relying on these signs for identifying a location may be confused by the inconsistency in use of symbols for the family room.

The other entrances to the mall are on the first levels of North Garden and South Avenue. These entrances are on street level across from an unsheltered parking lot (Figure 11). The entrance is overpowered by the long, massive horizontal wall stretching from one department store to the other. The entrance is basically a box cut into the wall with a large sign overhead, displaying the Mall of America logo. It establishes a visual reference of the boundary between the reality of the outside environment and the reality of the shopping world and the amusement park. The sign curves out from the wall slightly and does not attempt to distinguish itself from the wall, only to label the structure with a name and limit its appeal to those searching for a place to park, ultimately directing them to the parking ramps (see App. B no. 5 and 6).

A wide corridor extending from the entrance is what connects the user to the main corridor of the retail environment and access to the environment of the amusement park Camp Snoopy. The retail environment is divided into four corridors, or districts, with each

Figure 11. Main entrance to the Mall of America.

possessing distinguishing characteristics to provide variety and to aid users in wayfinding (one of Lynch's techniques, that of creating district characteristics to distinguish parts of a building from each other). This includes lighting, architectural features, floor coverings, landmarks, visual concepts, identifying symbols, and color coding.

West Market district

West Market is differentiated through its concept of an old train station, with a high barrel vaulted ceiling and exposed metal rafting (Figure 12). West Market contains a majority of the stores in the areas of jewelry and accessories, luggage, optical, sporting goods, and toys. The corridor is a long, straight atrium with columns aligned down each side of the corridor, marking the pathways on each side. The two pathways are connected by diagonal walkways on the upper levels and by a central node in the form of a large column (about

Figure 12. West Market corridor.

twenty feet in diameter), located in the middle juncture of the corridor (where the corridor from

the parking lot and the entrance to Camp Snoopy are located). The color scheme is that of dark

green columns, rust and gold colored railings, and gray tiling. The light fixtures consist of a

group of circular lights wrapped around the green columns with gold colored supporting

fixtures. These lights and columns create a static rhythm lining the entire corridor, which can

be seen from one department store to the other. The floor covering is that of light and dark gray

square tiling on the first and second level, with carpet on the third. The first level has several

market carts to create a "market" atmosphere as the name would suggest, but this does not

associate well with the architectural concept of the train station. It is an indoor market because the main source of light is artificial. The identifying symbol for West Market is a personified sun, which is not highly motivated with either concept, especially when no sunlight is drawn in through the ceiling (see App. B no. 11).

Each district also has a secondary graphic extracted from the identifying signs placed in the free-standing directories which are located at decision points. The secondary graphic of West Market is a section of a cloud, which does associate with the sun graphic. This secondary graphic is used on the directional signs within the district, which are located in the central node areas (Figure 13). The graphic is a gold colored outline and is barely legible, thus defeating its

Figure 13. West Market identifying graphics.

intent as an identifying characteristic on the directional signs.

The identifying color of West Market is dark green, which is used as the color of the district's directional signs, the color of parts of the free-standing directories, and is also incorporated into the color scheme of the interior architecture. The use of dark green becomes a highly visual characteristic of West Market. The central node area of West Market is iconic for a focal point or axis of diagonal and straight pathways (Figure 14). The node is emphasized by the rust and dark gray checkered tiles in the form of a circle within the large circular column and in the form of a rectangle near the elevators and escalators, which are opposite the large
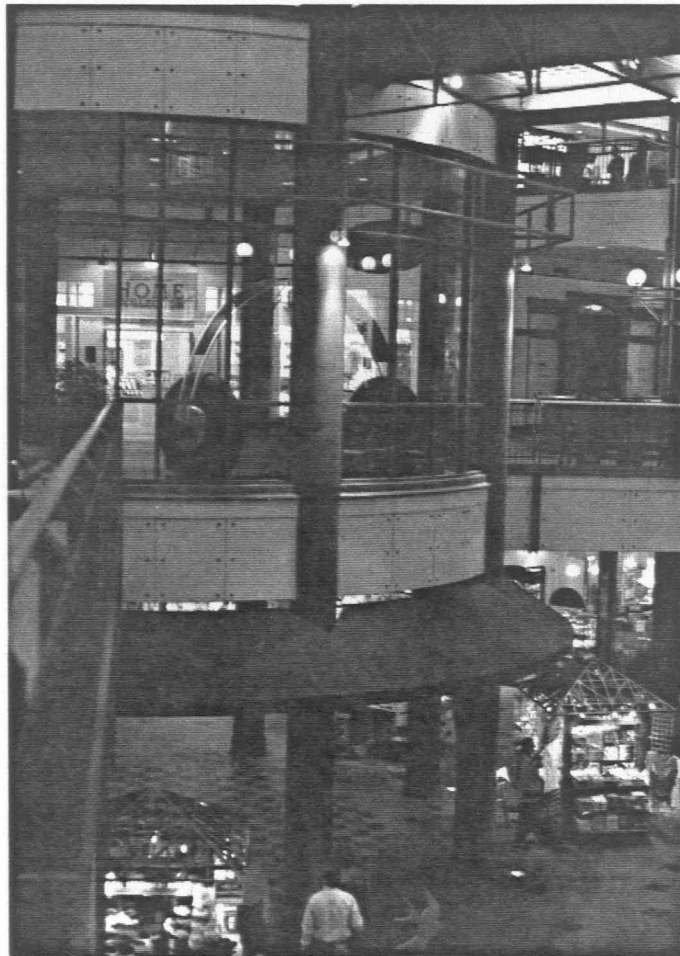
Figure 14. West Market node.

column in this node. (All vertical access is located in district nodes or in department store

courts). The creation of this focal point prompts users to acknowledge their location in lue of

changing the direction of their path. Directional signs and free-standing directories are also

located in each district node, providing direction for those relying on route or configurational

knowledge (Figure 15). The West Market node creates a place for rest by providing a break in

the long corridor, and also a place for changing direction, whether horizontal or vertical. The

Figure 15. Directional signs and directories in node.

first level (and at times the second and third) of each node also provides direct access to Camp

Snoopy. The West Market node access leads directly to the Snoopy Bounce, a large inflated

balloon of Snoopy dressed in camping gear and facing West Market, in which children are

allowed to bounce (Figure 16). This Snoopy can be seen from all vantage points within the
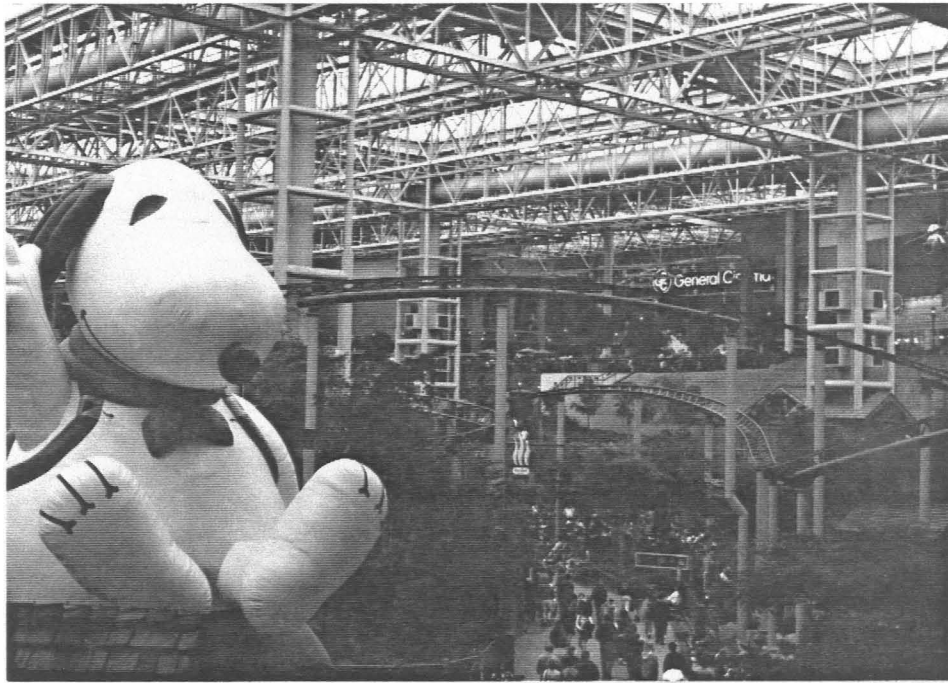
Figure 16. Snoopy Bounce and General Cinema sign.

camp and from each district node opening, acting as a landmark. Snoopy is accompanied by his own water dish around which people gather to rest, to observe, or to meet others (see App. B no. 12).

Directional signs

The directional signs in each district node and at the end of the corridors to the parking lots are all color coded and use upper and lower case letters, flush left, with arrows indicating direction for each listing. Upon analysis of the signs in each district, all signs are not consistent in their use of arrows. Some signs place arrows next to each listing, whereas some signs list two destinations with only one arrow (Figure 17). The confusion with directional arrows does exist as to whether a down arrow is indicating down one level or back the other direction, as with the confusion with the up arrow (Arthur and Passini 1992). Adding inconsistency with
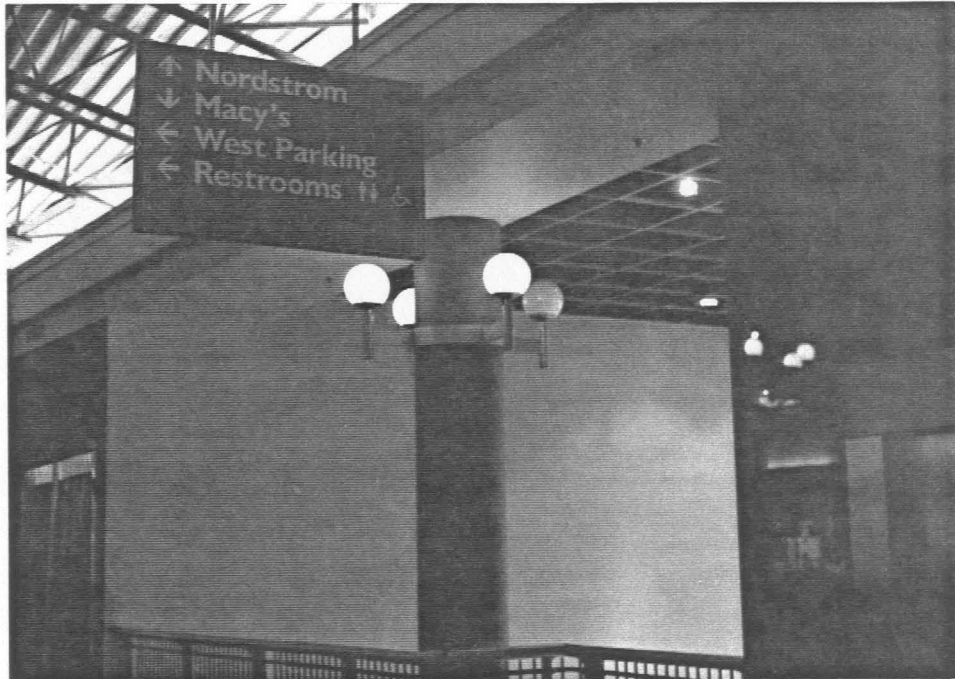
Figure 17. Inconsistencies in directional sign arrows.

usage can create additional confusion for users, especially for those who do not read English.

The signs do use international symbols for restrooms, handicapped accessibility, and

information (guest services) with the appropriate English listings, which aids a non-English

user. All directional signs hang from the ceiling by two thin rods, about eleven feet from the

floor. They are located directly in the path or just to the side, which causes them to be highly

visible blocks of color, except in the corridors to the parking lots, where the signs are placed

in the center of the corridor amidst other visual information such as the identifying sign of the

section, causing them to become difficult to perceive (see App. B no. 13 and 25).

Directories

Directories are located in each district node and in the department store courts at each

corner of the mall, all of which are the points of decision within the mall. The directories

consist of an identifying symbol for the district location and its name, five directory maps—

four smaller and one larger of the present level location, store listings with number locations,

a key for the symbols used on the maps, and an information phone. (The directories in the

courts use the Mall of America logo in the identifying symbol section). The directories are large

square posts, about eleven feet tall and three feet wide, and are usually placed to the side of the

path in order to eliminate areas of congestion (Figure 18). The maps are aligned according to

the direction the user is facing; however, the maps are quite vague as to the exact location of

stores, each of which is listed in number groups for a general area of the corridor, such as

W358<W331. The directory maps also lack visual cues and landmarks for each district, for

they are quite stylized and consist mostly of blocks of color. The you-are-here arrows are

ineffective at times because the maps do not provide enough reference points or landmarks for

immediate location identification and for the formation of route knowledge. The use of symbols

on the maps is confusing in places such as the end of the corridor exiting to the parking lots,

where four or five symbols lining the length of the corridor on the map are actually all located

Name of district (color coded) or "Mall of America" in courts

Symbol of district (color coded) or Mall of America logo

Maps oriented in direction facing
(enlarged map is present level location)

Key for symbols on maps

Store listings and number locations

Gold stars with background color coded according to district
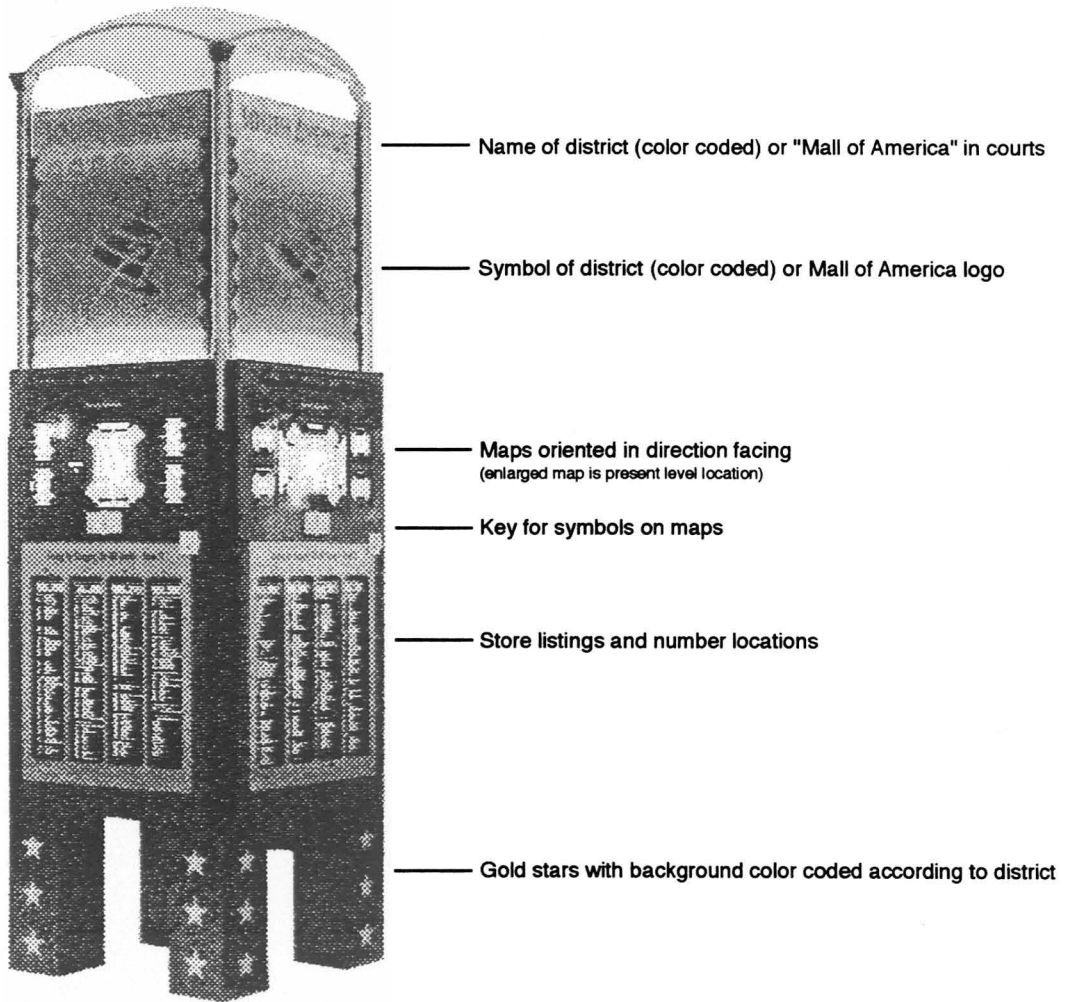
Figure 18. Directory.

at the end of the corridor. Also, (as previously mentioned) the symbol usage is not consistent with the symbols used in the actual location. For example, the TDD symbol (text telephone) is used on the map, but a phone receiver symbol is used in the actual location, possibly creating confusion (Figure 19); (see App. B no. 24).
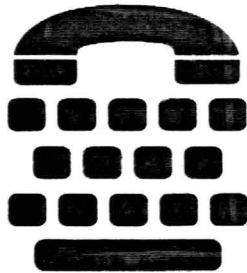
(a)

(b)

Figure 19. (a) International TDD symbol and (b) Emergency exit.

South Avenue district

The second district is South Avenue, which revolves around the concept of a high-class boulevard filled with retail shops to tailor a night on the town (South Avenue houses a majority of the women's and men's apparel shops). The identifying symbol of South Avenue is a top hat, supported by the secondary graphic of a crescent moon and the color purple (Figure 20).
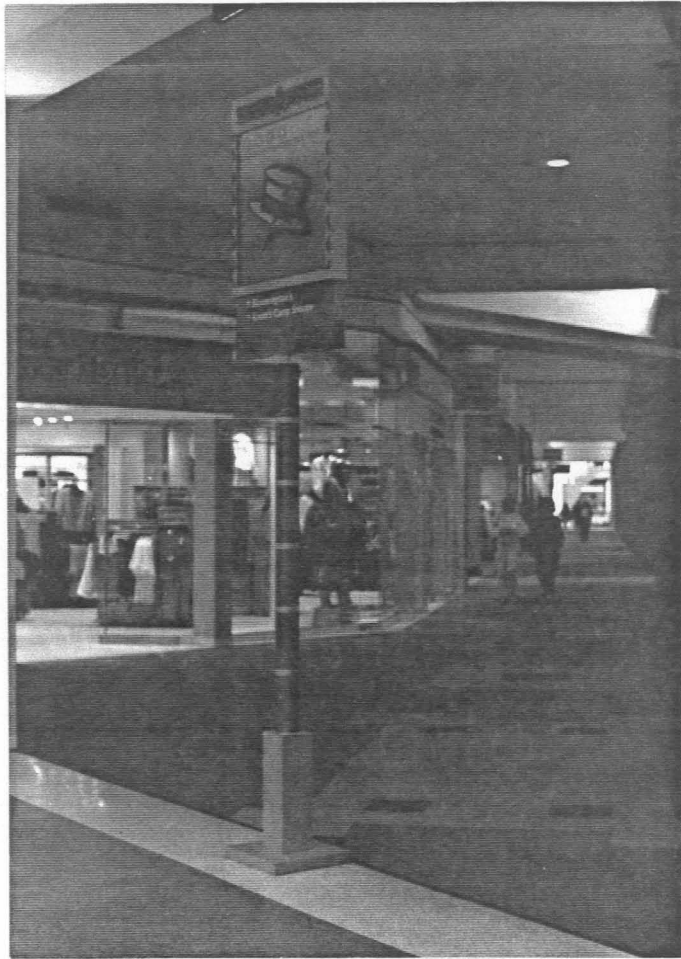
Figure 20. South Avenue identifying graphics and court directional sign.

The corridor of South Avenue is straight, providing visual access to the escalators in the central node and to the court at the opposite end. However, the third level is a single curving path that blocks visual access to the third level from the lower levels in most areas (Figure 21). All three levels are carpeted, with coral, cream, and grayish-green colors as the predominant

Figure 21. South Avenue corridor.

architectural colors. Square columns line the corridor on both sides as in West Market, creating a rhythm and linear sequence from Macy's to Bloomingdale's. The lighting in South Avenue is soft and subdued, with the use of lower ceilings and tinted glass on the main light fixtures hanging from the ceiling in the middle of the corridor. These black and white light fixtures are contemporary chandeliers in the form of a three-dimensional star trimmed with smaller stars, which try to convey the Hollywood glamour concept of dressing in high-class clothing for

a "night on the town" (the light features also tie in with the logo of the Mall). The large light

fixtures may almost be too contemporary, for the chandelier connotation is not highly

expressed and they distract from the subtle colors and cream lighting along the pathways on

either side. The overall concept of the high-class boulevard is portrayed in subtle ways, for

only the mood of the boulevard is created and not highly memorable features that could encode

as district characteristics for South Avenue into cognitive mapping knowledge. The top hat is

a highly motivated symbol for the concept; however, the concept is not expressed enough for

users to form a connection. The use of South Avenue's color code of purple is not incorporated

into the architecture at all, which could have been a strong identifying characteristic for

the district (see App. B no. 14).

The central node of South Avenue is diminished to only the presence of elevators and

criss-crossing escalators located right behind the elevators (Figure 22). The functional aspect

of the elevators is not communicated well from within the corridor and node, for the levels

above enclose the elevator shaft and do not permit visual access to the upper or lower levels

(see App. B no. 15). The node is also identified through the addition of cream colored arches

and the presence of the Lego Imagination Center. For wayfinders, this subtle change in

architecture barely indicates a point of decision; however, the Lego Center does act as a

landmark and a reference point on the directory maps. The Lego Center is contained in its own

space defined by columns, abrupt changes in carpet color, and structural beams and posts

which actually create a "box" for the Center (Figure 23); (see App. B no. 32).

South Avenue also houses the General Cinema or movie theaters on the fourth level.

The General Cinema is identified by a large, strongly horizontal sign that is visible from the

third level food courts in South Avenue and from most vantage points in Camp Snoopy, such

as the openings at each node that either view into the camp or provide direct access (refer to

Figure 16). This sign acts as a landmark for South Avenue for those users who are aware that

it is located in this district (no other indication exists, except for its presence on the directory

Figure 22. South Avenue node.
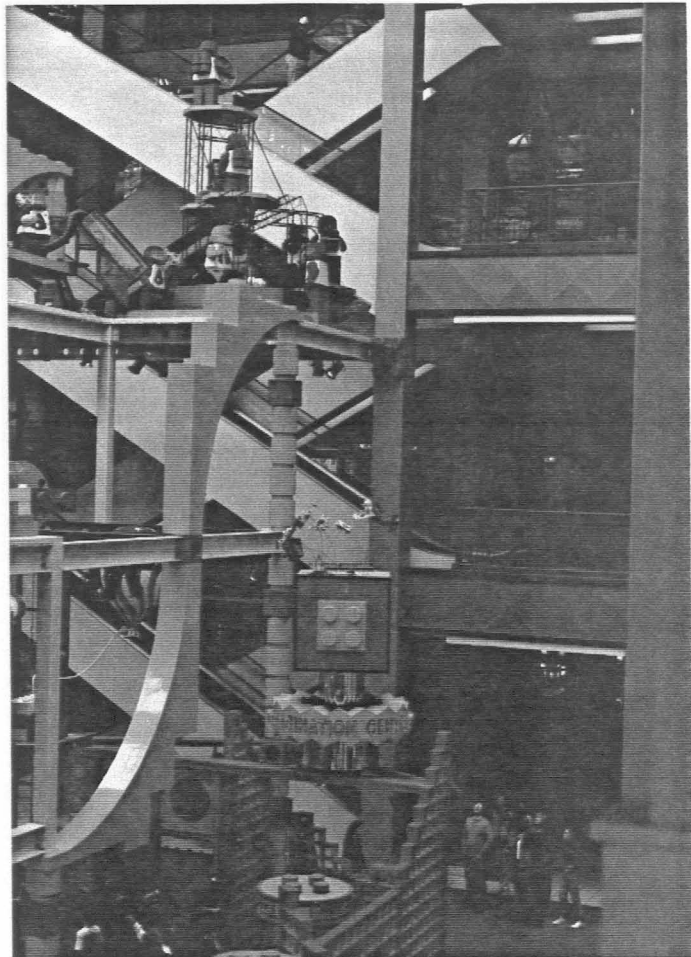
Figure 23. Lego Imagination Center.

maps), and can apply cardinal directions well in the conception of spatial layout. The sign itself does not provide any indication that theaters are located in this area other than the word "cinema", which would not aid a non-English user for identifying the theaters.

East Broadway district

The third district is East Broadway, whose main concept is that of a high-tech arcade of shops that is geared towards younger consumers (Figure 24). This district contains a

Figure 24. East Broadway corridor and identifying graphics.

majority of the shops in the areas of electronics, travel, movies and music, specialty shops like "Techno Comix", along with quite a few restaurants and all of the nightclubs (the entertainment district or "Upper East Side" on the level four). This corridor is also straight, providing visual access from the court of Bloomingdale's to the court of Sears. The district is characterized by numerous neon lights and signs, a lot of reflective surfaces such as metal and glass, large blocks of blue panels lining the walkways and corridot, and large aluminum cylinders as posts lining the corridor on each side. The main sources of light emanate from large bands beneath the walkways connecting the two sides of the corridor and from the numerous neon bands which are in the form of multiple squares. The environment strongly conveys a sense of technology and artificial surroundings which is quite differentiated from the other districts, thus providing more information to encode for route and configurational knowledge. The identifying graphic of East Broadway is a saxophone and the secondary graphic is a profile of a quarter of the sun, both of which are not highly motivated with the concept of the district. A saxophone can portray a "hip" or "cool" image, which can tie in with the youth oriented concept, but the association is not strong and would not provide wayfinders with a mnemonic cue for identifying the district (see App. B no. 16).

The central node of East Broadway is quite distinguishable as a point of decision, for it is in the form of a large rotunda which has a diameter that is wider than the corridor. Visual access to the node is limited from the two ends of the corridor because it is so wide, but once users are within close proximity they must change the direction of their path into a circular fashion in order to reach the other side of the rotunda and continue down the corridor (Figure 25). The west side of the rotunda holds criss-crossing escalators and access or large openings into Camp Snoopy; the east side of the rotunda holds the glass elevators. The rotunda is an open atrium from the first to the fourth level, providing a wide range of viewing areas into the rotunda, like a large gladiator pit or a coliseum where people watch from above the activity occurring in the center on the lowest level. One fault of the rotunda is that it does not provide

Figure 25. East Broadway.

any directional signage in this area, only directories, which could confuse wayfinders relying on route knowledge only (see App. B no. 17).

North Garden district

The final district is North Garden, which is the only district that develops high motivation between its name, its identifying symbol, and its architectural features. The identifying symbol of North Garden is a flower with a secondary graphic of a butterfly, two items one would expect to find in a garden in most parts of the world (Figure 26) .

Figure 26. North Garden and identifying graphics.

The corridor curves to imitate the serpentine pathways of a garden, and is also lined with brick-colored tiles on all but the third level, which is lined with carpet. The corridor is filled with potted plants and trees, a square and a circular gazebo, trellises, and even a fountain (Figure 27). The main source of light is sunlight streaming in from the glass ceilings, another strongly

Figure 27. North Garden corridor.

associated characteristic of a garden. North Garden houses a majority of the stores pertaining to the outdoors, books, gifts and cards, and shoes, along with a large miniature golf range, named Golf Mountain, on the third level (Figure 28). The curved pathways of North Garden can create confusion for some wayfinders, for the two gazebos are located at the high point in
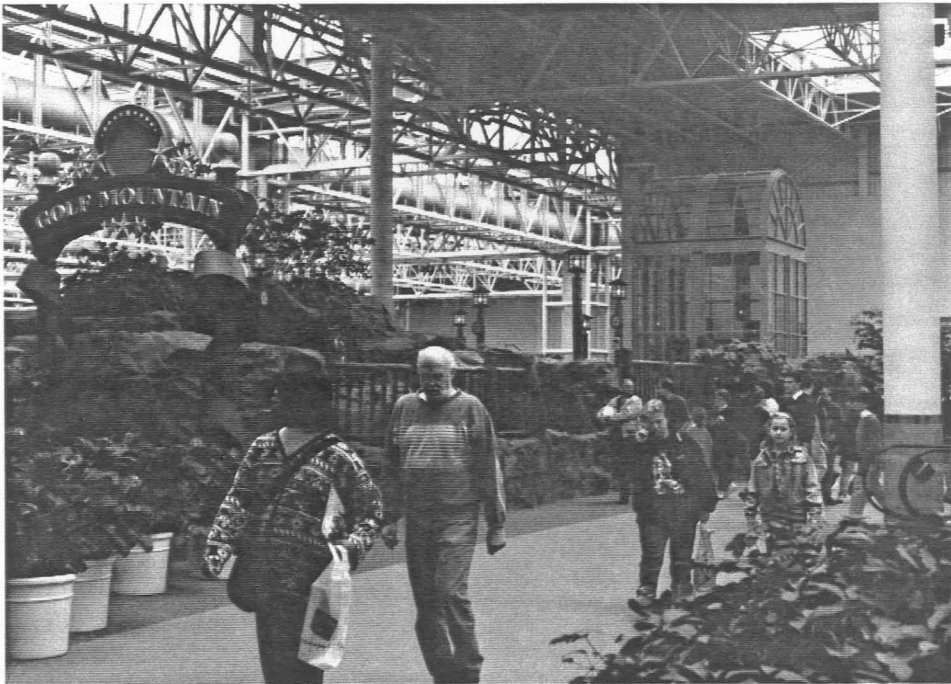
Figure 28. Golf Mountain.

the curves, almost causing them to be mistaken for the central node due to the change in architecture. Visual access to the central node from the courts is obstructed by this curving pathway. The central node is identified mainly by the presence of the escalators, the elevators, and the directional signs (refer to Figure 26). The directional signs are dark pink, which is not incorporated into the architecture for identifying purposes, but the pink signs act as highlights

to the abundance of green plants and brick-colored tiling, as if the signs were actually blooming flowers (see App. B no. 18 and 19).

Department store courts

Each district is separated from the next by an anchoring department store court at the four corners of the mall, all of which are atriums with escalators to the upper levels. Each court acts as a resting area between districts, allowing the user to leave one district and become rejuvenated to perceive another. The courts distinguish themselves by establishing different atmospheres based on the social implications of the anchoring store. The Bloomingdale's court entails a highly sophisticated atmosphere through its use of thin columns and natural light mixing with gold reflections from the railings (Figure 29). Macy's court is symbolic of a California street with soft, natural light mixed with light from early twentieth century street lamps, along with a variety of west coast plants, such as palm trees (Figure 30). The Nordstrom court is highly organic, almost to the point of an arboretum with its abundance of plants and trees, along with a large fish pool (Figure 31). The Sears court, however, lacks in creating an atmosphere because the court is very open and plain with few structures provided for seating or rest (Figure 32); (see App. B no. 20-23).

Each court contains directional sign posts identifying the edge of the district along with possible destinations when entering that district (refer to Figures 20 and 24). These destination listings are printed underneath the identifying symbol in a relatively small type size for distance viewing. The destinations are vague and somewhat misleading. For example, the South Avenue sign at the edge of Macy's court lists Bloomingdale's and then Knott's Camp Snoopy as possible destinations. Lego Imagination Center, which is in South Avenue's node, is not listed, and Bloomingdale's is the farthest of the destinations. These signs are geared more towards those who rely on configurational knowledge since they are so vague and out of sequence, and are mainly used for identifying purposes of the district (see App. B no. 35).
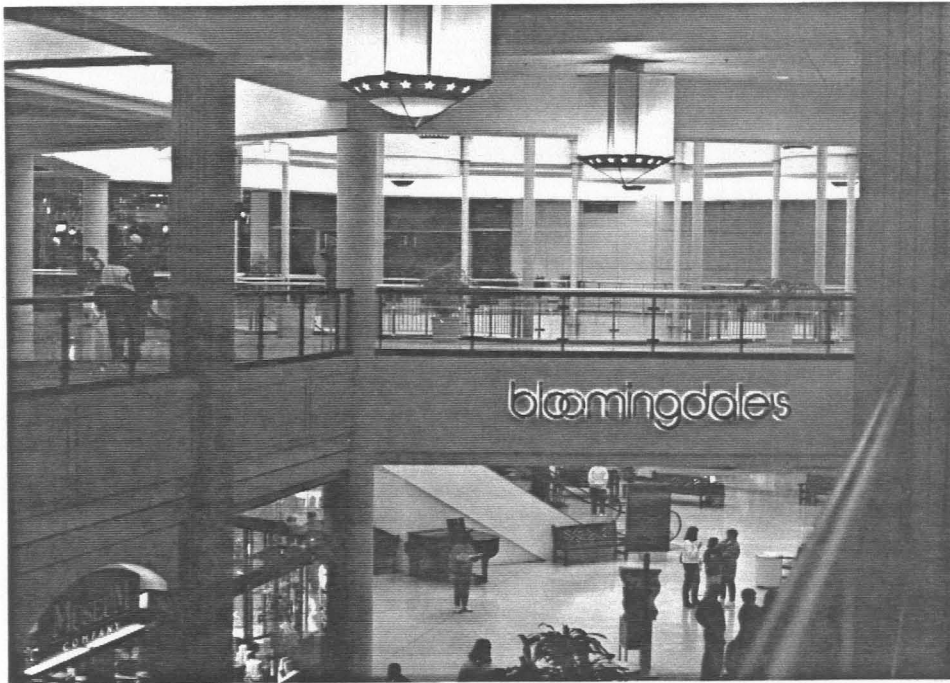
Figure 29. Bloomingdale's court.

Figure 30. Macy's court.

Figure 31. Nordstrom court.
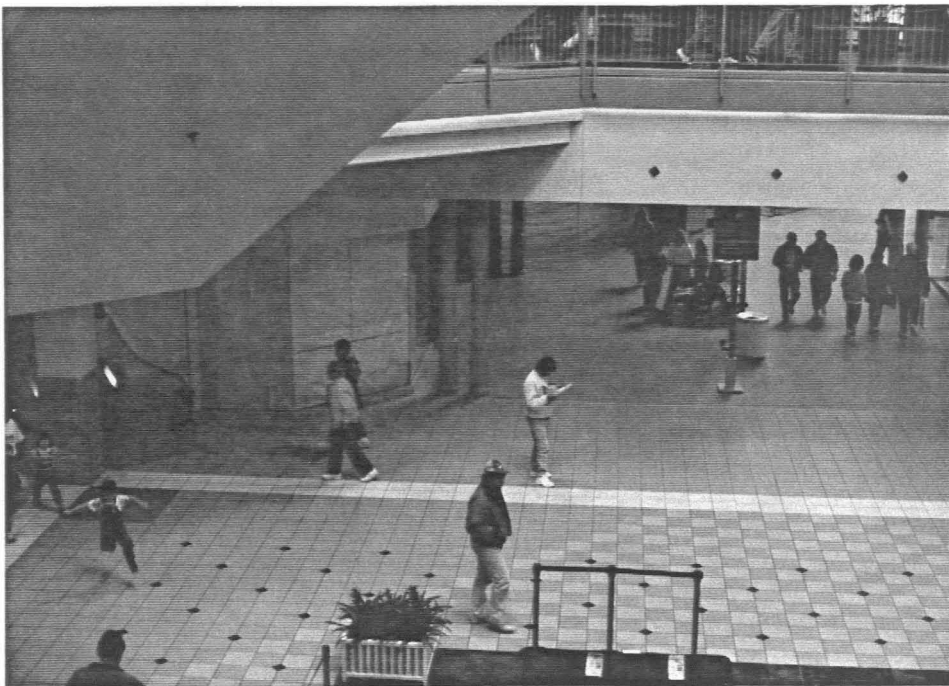
Figure 32. Sears court.

The use of tile is highly incorporated as a visual device for defining the edges between the courts and the districts, along with other architectural features such as the color of the walls, columns, and light fixtures (refer to Figure 32). Tile differentiation also defines the edges between Camp Snoopy and the retail sections of the mall (Figure 33); (see App. B no. 33 and 34).

Landmarks

Within the districts and the courts, users are able to perceive and encode various, though few, landmarks. The designers did not facilitate the use of landmarks in order to aid in wayfinding. By adding more reference points for users as they are navigating and illustrating these points on the directories maps would allow users to develop stronger and more

Figure 33. Camp Snoopy entrance in West Market.

memorable routes and configurational maps. The main existing landmarks include the Lego

Imagination Center, the Snoopy Bounce in Camp Snoopy, the large General Cinema sign

when viewed from Camp Snoopy or other district nodes, Golf Mountain on the third level of

North Garden, and to a lesser extent, the fish pool in Nordstrom court, the Warner Brother's

store facade (Figure 34), and the circular fountain and the two gazebos in North Garden.

Of these landmarks, only the names of the Lego Center, Golf Mountain, and General Cinema

are placed on the directory maps (see App. B no. 27-31).

Emergency exits

Amidst the corridors, the landmarks, and the department store courts are numerous red

lit exit signs and accompanying emergency exit doors. These doors are singled out from their

surroundings by lack of character, for the framing architecture is plain and the doors recede

from the main pathway (Figure 35). These exits are designated for emergency use only and are

located all over the mall. Beneath the mall is a large network of service and security corridors,

along with offices and maintenance rooms. Some exit doors provide TDD and pay phones for

emergency or standard use (see App. B no. 38, 39).

Also pertaining to emergency routes are the symbols used to illustrate elevator use

during emergency situations. The symbols used are iconic (silhouettes of the actual activity) for

"use the stairs" and "do not use the elevators" (Figure 36). The use of pictorial symbols and

not only words will aid those who cannot read English. Also, the use of two vertical circular

lights to indicate that the elevator is "going up" or "going down" is confusing, for the use of an

up arrow and a down arrow would communicate the function in a more iconic rather than

symbolic manner (Figure 37), (see App. B no. 36).

Figure 34. Warner Brother's store facade.

Figure 35. Emergency exit in East Broadway.
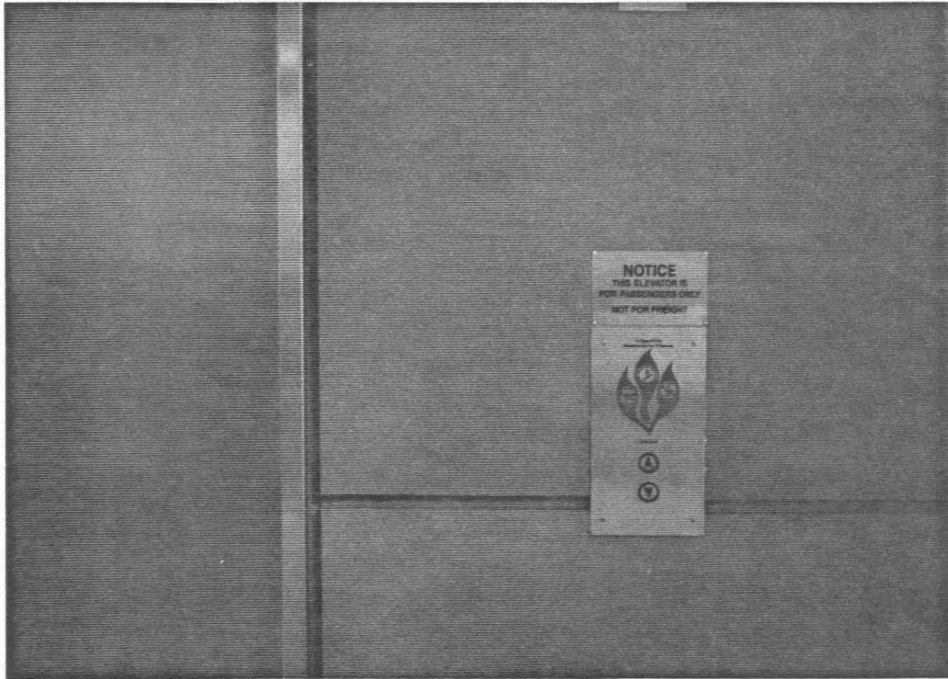
Figure 36. Elevator symbols.

Figure 37. Elevators in East Broadway.

Summary

The findings of this analysis revealed that the majority of positive design aspects geared toward aiding wayfinders were witnessed in the architectural features, including the extended visual access down most of the districts (or corridors), the distinguishing characteristics for each district, the open visual display of the functional aspects of the elevators and escalators, the well-defined edges and emergency exits, and the visual accentuation of the central node decision areas in East Broadway and West Market. The negative design aspects were predominately in the graphic areas, which include an inconsistency in the use of arrows and identifying symbols (such as the family room symbol), the lack of high motivation between architectural concepts of the districts and their identifying symbols (except for North Garden), the overly subtle attempt to create a secondary identifying graphic for each district, the vagueness of the court directional sign posts, the use of circles instead of arrows to indicate directional movement of the elevators, and the extremely simplistic directory maps which provide few points of reference for location identification. The architectural design lacks in the areas of incorporating the color code of the district into its architectural features, not physically identifying levels of the mall (whether through differentiation or graphic numerals), and the relatively low number of landmarks placed throughout the mall.

The analysis also revealed that the wayfinding design techniques incorporated into the mall are geared towards those who rely on configurational knowledge for navigating. The design techniques were expressed mainly in the architectural and interior design, prompting those who navigate by using route knowledge to rely on the few directional signs and possibly extracting information from the directory maps. The positive design aspects of the architecture aid those who rely on route knowledge to a certain extent. Those who cannot read English rely heavily on the architectural cues, and can become confused when attempting to decipher the inconsistent use of symbols, along with the lack of symbols on the directory maps. The attempt to aid the wayfinding of various users is prevalent, but the effort is still

lacking in the aforementioned areas. By creating higher motivation between architectural

concepts and the identifying symbols, plus illustrating these connections on the directory

maps, the users, whether English or non-English, would be able to establish a more elaborate

cognitive map and thus remember their location in relation to other areas of the mall and

ultimately increase their wayfinding abilities.

RECOMMENDATIONS

The graphic signage in the Mall of America fails to facilitate the wayfinding skills of its users, much more so than the architectural features designed to aid in wayfinding. The recommendations for improving the design aspects for navigation will focus on three areas in which negative design aspects were witnessed. The first negative aspect is that the direct identification of location is difficult, for the relationship between the name of the district, its identifying symbol, and its architectural concept is not always a strong relationship and can be difficult to remember. The second negative aspect of design is that a user must rely heavily on configurational knowledge for navigating. The directional signage is minimal and the directory map lacks in providing an adequate number of reference points. The third negative design aspect is the inconsistency of the symbols used on the directory maps and the symbols used in the physical location, which can confuse both English and non-English users.

Direct identification of location

The conceptual design of North Garden is one that is fairly easy to recall, for the concept of a garden is reinforced through the district's name, its architectural features (the abundance of trees and plants, gazebos, and trellises), and its identifying symbol (a flower). The other districts, however, are much more difficult to recall, causing users to be confused as to their location within the mall. Each district should be supported by signage and graphics that are highly motivated with each architectural concept. The solution is signage that has a figure (or mannequin) as the provider of directions within each district, holding the signs that indicate possible destinations.

Each figure will be placed on top of the directory posts, eliminating some of the hanging signs in the nodes and placing the point of directional information in one location.

Hanging signs will remain in the pathways leading in and out of Camp Snoopy, and at other

minor decision areas not located in the central node. An alternate typeface, Glypha, has been

chosen to add more character to the signs and to allow the serifs of the letters to complement

the horizontals of the signs and the figures (Figure 75). The signs on top of the directory can

be viewed from four vantage points. Users walking down a main corridor between two

department stores will be directed to the upcoming department store, restrooms, and parking

(if applicable) (Figure 76). Users coming from the parking or exit corridors will see signs

directing them to the two department stores at opposites ends (Figure 77). Users may also be

coming out of Camp Snoopy and facing the direction of the parking lots, thus also seeing signs

for the department stores, but from the opposite side.

Figures were chosen because each district has the thematic qualities associated with a

particular type of person or occupation. The figures chosen focus more on the denotative or

straightforward meanings of the district. The West Market theme of a train station will have

a train conductor (identified by its hat) providing directions; South Avenue's high class

atmosphere will use a figure with a top hat; East Broadway's hip and high-tech theme will use

a figure whose head will have the effect of being drawn by three dimensional computer

rendering; and North Garden's theme of a garden will use a figure wearing a straw hat. Each

figure is faceless and color coded according to the district's color (Figure 78). (North Avenue's

color has changed to the more associated color of green, relating to nature and outdoors, and

West Market's color has changed to a rusty or brick red, more thematic of a train station).

The sign posts in the department store courts (refer to Figure 20) will use the same figures and

color coding, except the figures will not use arms pointing in a particular direction (Figure 79).

The direct identification of one's location is also enhanced by removing the secondary

symbols from the directional signage and replacing them with the identifying hats of the district

(Figure 80), (refer to Figure 17 for original signs). The hat graphic would extend from the

rectangular shape of the sign, adding another layer of information. This would expose users to

ABCDEFGHI JKLMNOPQR STUVWXYZ

---

abcdefghijk lmnopqrstu vwxyz

1234567890

Figure 75. Glypha typeface.

↑ Nordstrom

← Restrooms

← West Parking

Nordstrom
↑

← Parking

↑
Vantage
Point

Macy's
↓
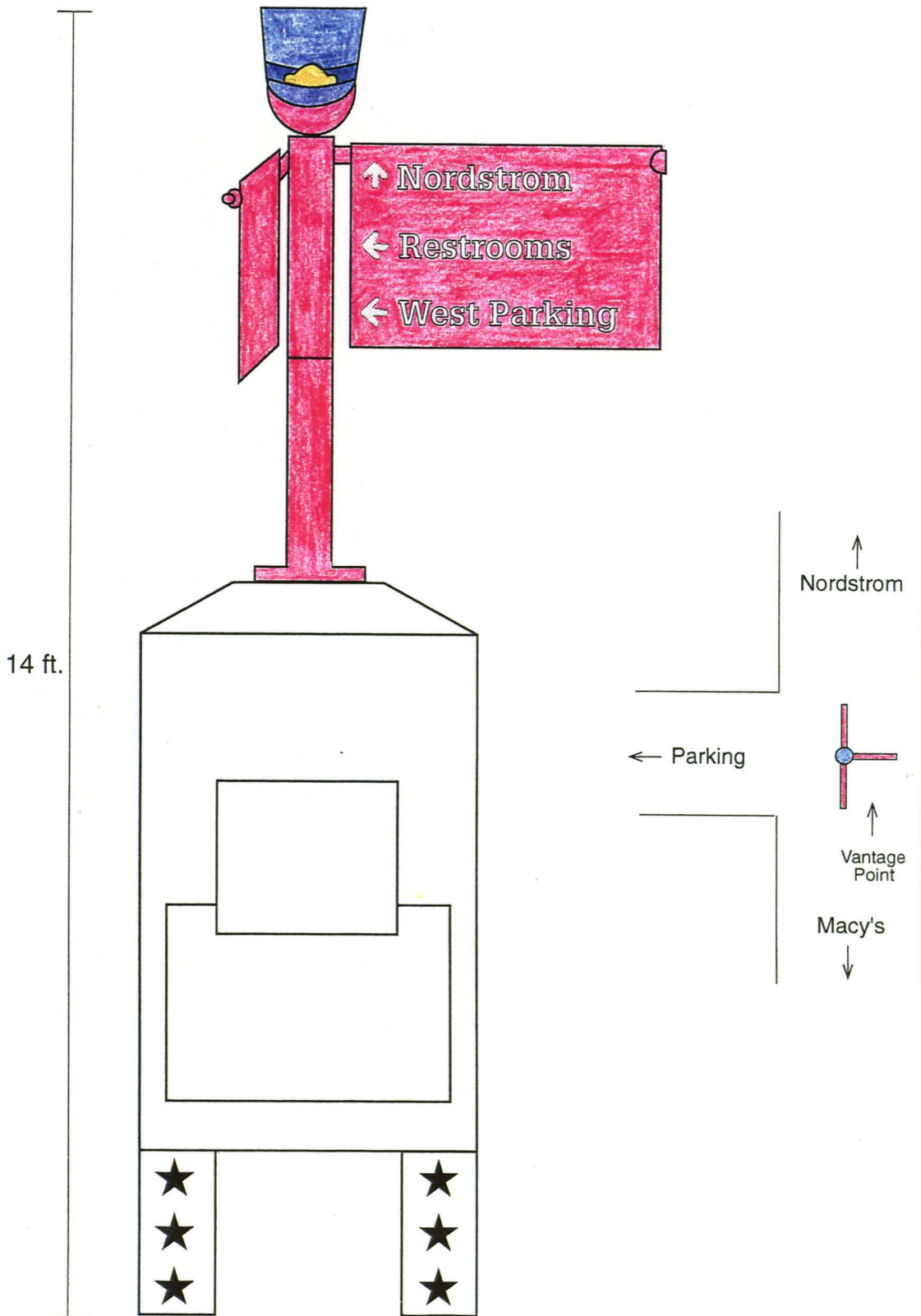
Figure 76. Directional signs placed on top of directory posts (main corridor view).

Nordstrom

Macy's

Nordstrom

← Parking

Vantage Point →

Macy's
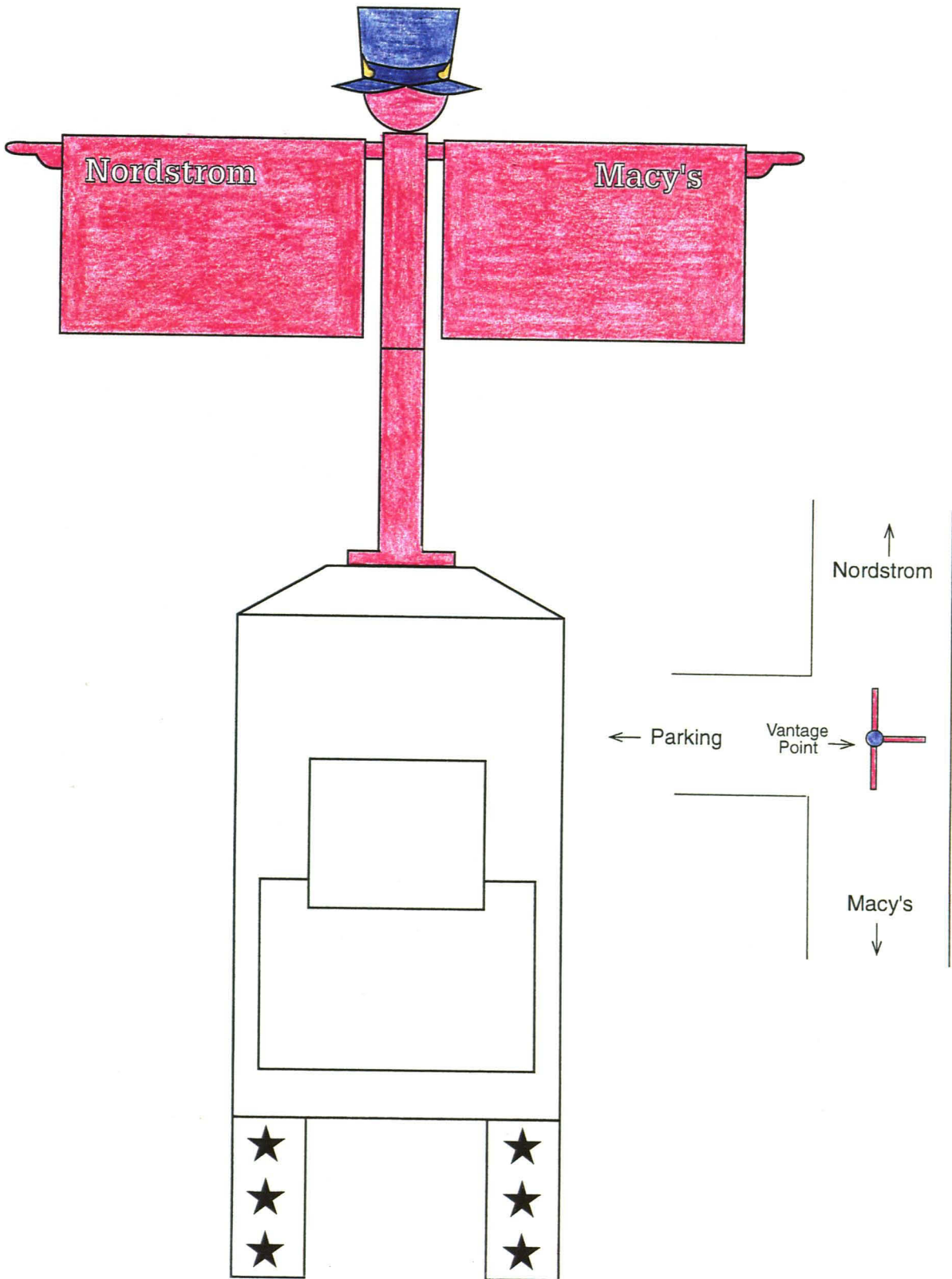
Figure 77. Directional signs placed on top of directory posts (parking corridor view).

Figure 78. North Garden, South Avenue, and East Broadway directional signs.
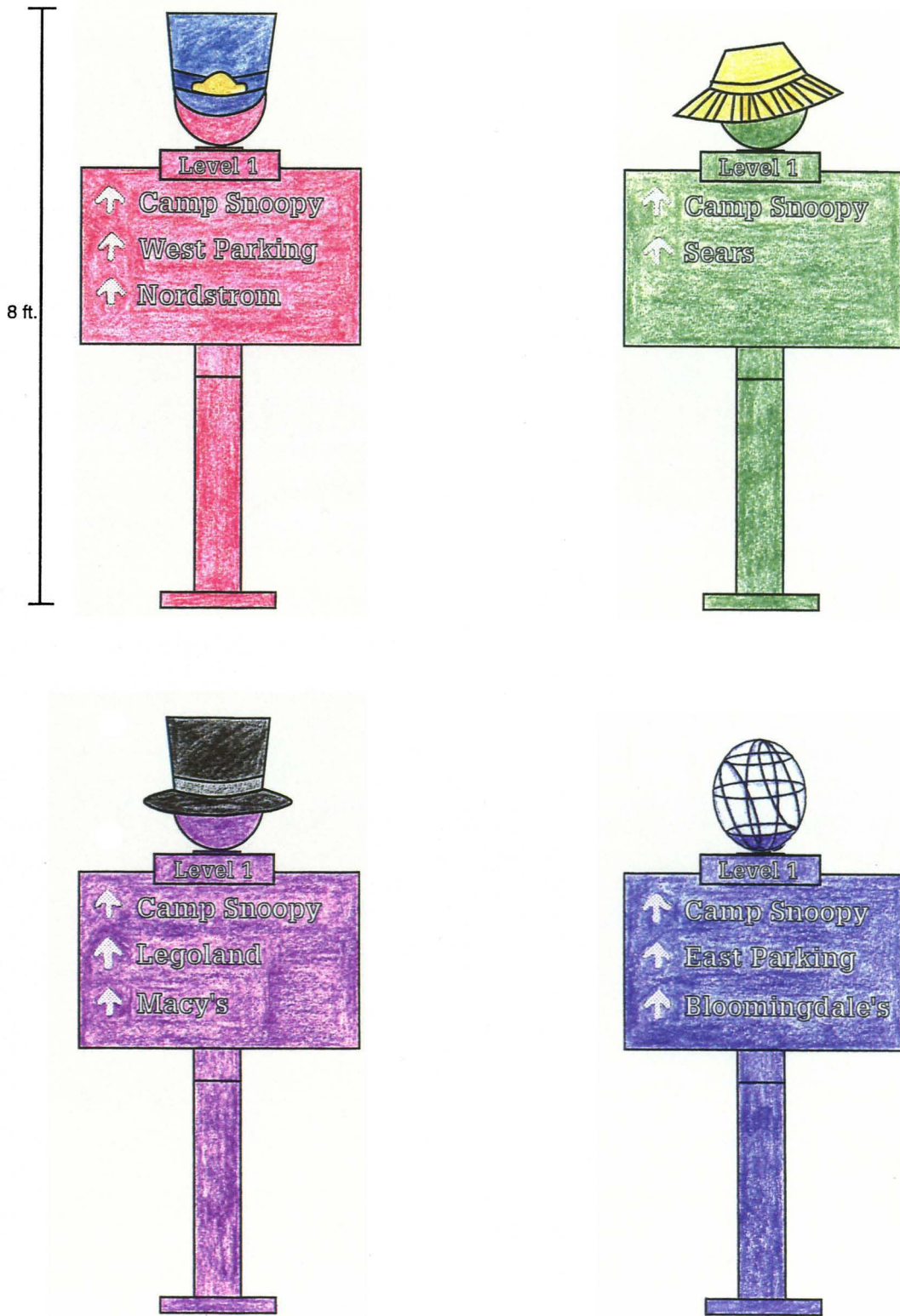
Figure 79. Signs posts in department store courts.
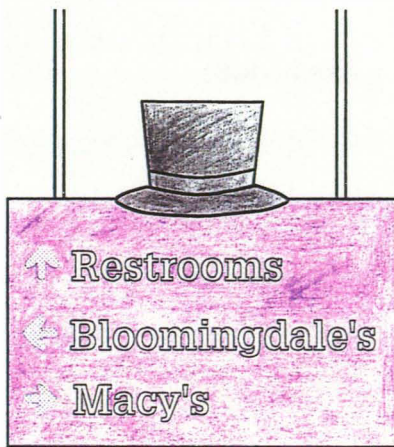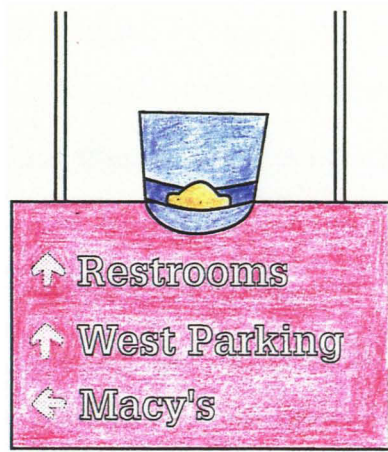
Figure 80. Hanging directional signs.

the identifying graphic of the district in yet another area, reinforcing the association between the graphic and the district's color.

Another graphic element to ease users in identifying their location would be to indicate level numbers. This element would be a color coded sign (according to district) with white type (consistent with the directional signage), reading "Level 1" and so on. Numerals are used for their universal translation across varying cultures (as suggested by Arthur and Passini). These signs would be placed in areas pertaining to decision points, including the top of the sign posts in each department store court (refer to Figure 79), within the sign posts at each entryway from the parking lot walkways or from the street, and at each elevator and escalator in the district nodes. Floor identification is a weak design aspect of the mall, for the only existing graphic identification is within the directory posts and the wall maps near the entryways.

Developing stronger route knowledge

Forcing navigators to rely heavily on configurational knowledge will create wayfinding difficulties particularly for first time users who are unable to develop a cognitive map from the directory map, along with users who prefer to navigate by following signs . Route knowledge is normally developed by connecting a series of reference points, those of which are few in number on the mall's directory maps (Figure 81). Adding landmarks (the few that exist) to the directory maps would provide more reference points for establishing a route for those who cannot rely on configurational knowledge for navigating. Reference points are also more functional if their location on the map is concurrent with their exact location. Numerous symbols on the directory maps were placed in the general location of what they were identifying, but should be placed in their exact locations in order to reinforce a user's route knowledge and perceptions of the environment as he or she is executing an action plan. The directory maps were redesigned to add more information for the formation of route knowledge and also to increase the information within a user's cognitive map (Figure 82). More landmarks
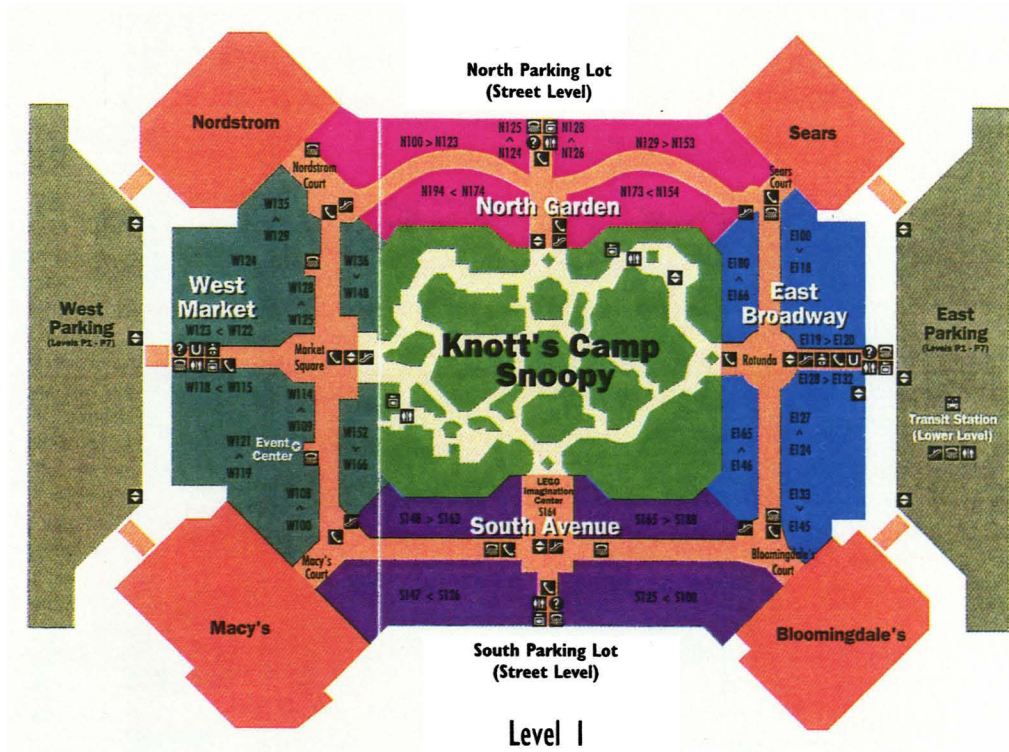
Figure 81. Current directory map of the Mall of America.
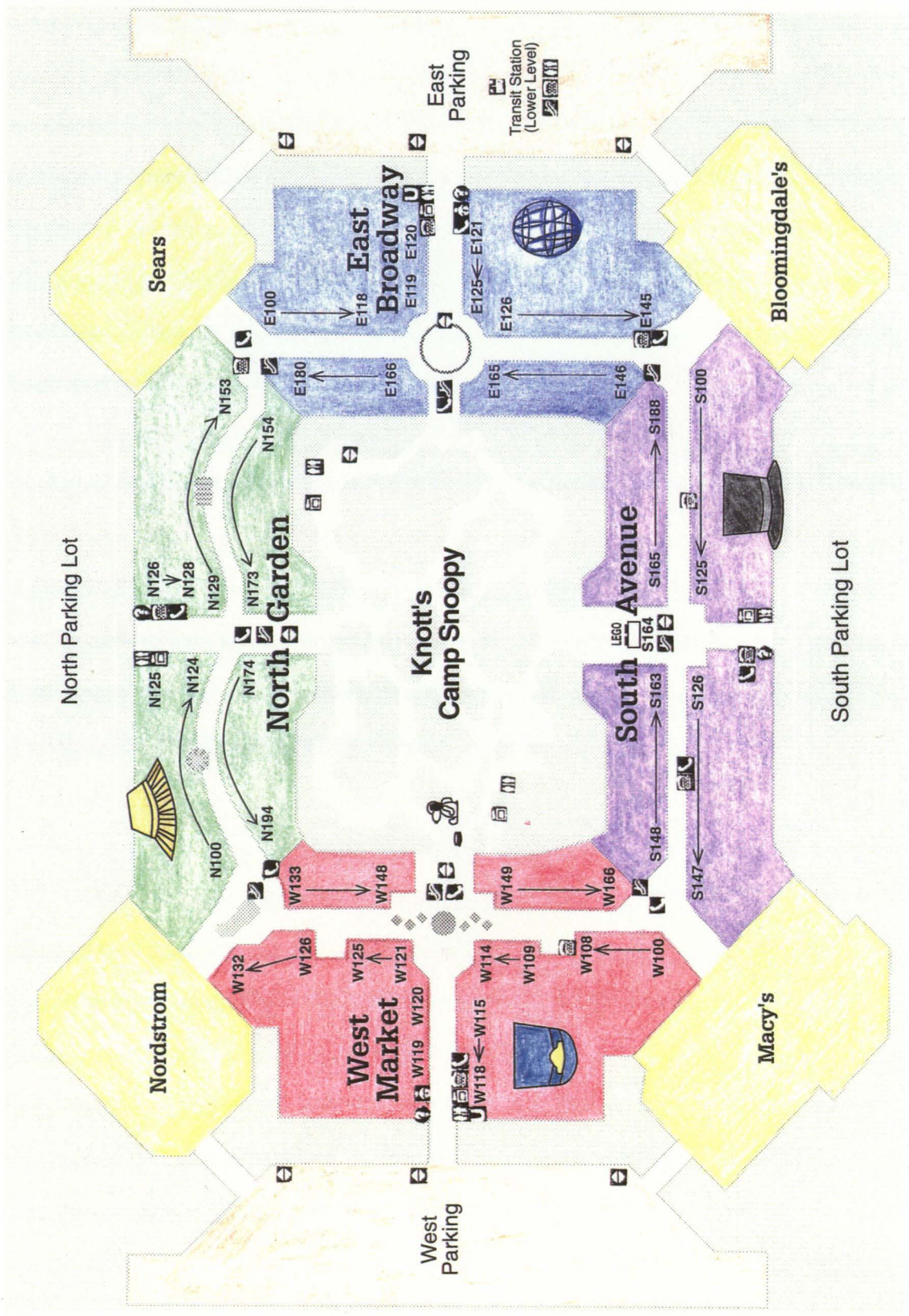
Figure 82. Revised directory map of the Mall of America.

were drawn in, such as the Snoopy Bounce and the Lego Imagination Center, to provide more points of reference; pathways were drawn with one color (white) to emphasize the continuous movement possible throughout the environment; store number locations were clarified to indicate the progression of number identification; symbols were placed in their exact location (instead of general location); and the concept of each district was reinforced by placing its identifying graphic ("hat") on the map. The Glypha font was used for identifying mall locations as a form of contrast between Camp Snoopy and the sections of the mall, and also to be consistent with the directional signage used in the mall.

The directory maps will be located on two opposing sides of the directory posts with the listing of store locations below the map. The remaining two sides of the posts will contain an interactive video geared towards those who rely on route knowledge and are in search of a specific location or type of store. The non-video map will help those users who rely on configurational knowledge for navigating, for it provides the overall layout of the mall and the locations of specific stores. The video display will aid those who need a more in-depth or step-by-step route for reaching their destination.

Consistency in symbol usage

As previously mentioned in the analysis, the inconsistency between symbols used on the directory maps and the symbols used in the physical location was witnessed for the TDD (text telephone) symbol and the family room symbol. The TDD international symbol adopted by the American Disabilities Act is used on the directory map, but the international symbol for the telephone is used at the site of the phones. A user searching for a TDD phone may not realize that the phones are located in that area without the displaying of the TDD symbol. It is recommended that the TDD symbol hang directly below the phone symbol currently in use in the physical location (refer to Figure 19). For the family rooms, the symbol of the family of four currently in use in the physical location should be replaced by the international symbol for

a nursery that is used on the directory maps. This would eliminate any confusion for users searching for a symbol they have seen on the maps and expecting to locate it in the physical environment.

Another symbol applied quite frequently on the directory maps is the symbol of an up and down triangle or arrow to indicate the location of the elevators. The symbol is incorporated into the environment on a small scale as graphics for the elevators buttons, however, the symbol could also be incorporated on a larger scale if it were to replace the circular lights that indicate the vertical movement of the elevators. Triangular lights would convey a more denotative meaning of movement and could also act as an identifying element for the elevators that coincides with the identifying symbols on the directory maps (Figure 83).

Figure 83. Elevator symbols incorporated into elevator signage.

CONCLUSION

Good communication, whether it is literal or interpretive, is an essential part of soliciting correct behavior for those who are in search of a destination. The search may be one of leisure or it may be one of utmost urgency. Either way, providing directions with signs that communicate accurate and reliable information is essential in order for the user to succeed. The universality of the communication has become an important factor for those who provide direction and information to a variety of users. An American designer can no longer assume that all users read English and are familiar with the social customs of the American culture.

It is through culture that a language base and behavioral codes of its people is developed. Culture also determines how the physical environment will be structured. Signs are a tool that a culture devises for making sense of the world through its own interpretation and perception. Thus, a user who is unfamiliar with the culture will not be able to navigate successfully without signs geared towards universal communication.

By understanding the difference between iconic, indexical, and symbolic signs, designers can focus on conveying meanings through the type of sign that is geared towards crossing cultural boundaries, those being signs that are iconic. Iconic signs convey the denotative meaning of the sign, providing a similar relationship between the signifier and the signified. Designers who emphasize connotative meanings in signs are employing symbolic signs and are directing the message towards a particular culture or group, excluding those who are unfamiliar with the culturally influenced definition. By focusing on the denotative meaning, designers are communicating a message through a sign whose literal and functional meaning can cross cultural boundaries, allowing users of varying cultures to understand the message. Emphasizing the connotative meaning or incorporating key symbols into graphic signage

should only be considered when the architecture can substantiate the biased graphics with a more universal interpretation of the message.

For every situation, two modes of reality exist: the concrete reality and the symbolic reality. The concrete reality is the denotative reality consisting of the physical qualities of the environmental setting. The symbolic reality, however, is the connotative reality. It is the cultural meaning attached to the situation and will usually take precedence over the concrete reality (Fawcett, Halliday et al. 1984). Designers interested in more universal communication can limit the amount of precedence the symbolic reality can have over the concrete reality by providing stronger denotative signs within the situation that would downplay the importance of the cultural influence. This downplay can occur through the emphasis of planes of expression, or signifiers, in architecture, mainly the physical aspects such as the materials, surfaces, and textures. The plane of content, or signifieds, of the architecture (the ideological function) would not become the dominant meaning in the message, allowing the plane of expression to communicate the more universal meaning. The reality, whether it is concrete or symbolic, will be interpreted by the user through the signs and codes perceived in the situation and the environment. Since architecture records the behavioral patterns and orientation of a culture, it is important that designers are aware of how that architecture is communicating, whether it is more through the plane of expression or through the plane of content.

The semiotic discussion of signs in these terms is rarely found in the field or classrooms of design. It is an area lacking in terms of exposing designers to the realities behind the messages they are communicating, especially when communicating to other cultures. Designers should be aware of how culturally bound signs can be and be able to recognize this while they are designing, especially if they are designing a sign system to direct various users around a built environment.

Users interpret signs and codes in the environment and encode these interpretations

in the form of cognitive maps in order to structure a sense of reality. This cognitive map develops through three levels of information: landmark knowledge, route knowledge, and configurational knowledge. Designers of wayfinding systems should provide information for all three levels of knowledge, for each user could be at a different stage in the development of a cognitive map and users will be influenced by their culture on how they interpret their environment while navigating. Some cultures use tools that allow them to interpret reality in the form of cardinal directions and measurements, whereas some cultures do not use these types of tools and rely on landmarks for recalling their perception of the environment. Signs within an environment that convey messages designed to be interpreted by a variety of users, all of whom structure and encode information in different ways, will allow the users to receive the message through similar interpretations, soliciting the correct behavior from the users for reaching their destinations. Universal messages would, in an ideal world, structure similar realities in all who perceived the meanings, disposing of any disorientation or wayfinding errors.

Designers can also reduce disorientation and wayfinding errors by incorporating the techniques described by David Lynch, that of emphasizing pathways, edges, district characteristics, nodes, and landmarks. These are elements that people rely on for navigating through cities, and thus can be incorporated in building and wayfinding design to aid users in structuring their spatial knowledge for navigating through the building. These elements contribute to the formation of cognitive maps, supplying the range of information needed from basic landmark knowledge to complex configurational knowledge. Physical setting qualities can also contribute to the formation of cognitive maps and increase the wayfinding abilities of various users, that of incorporating a higher degree of differentiation, providing more visual access to possible destinations, and providing spatial layout complexity information.

The methodology for analyzing the Mall of America was established based on these concepts that were presented in the Literature Review. This is a method that can be applied to

any environment that provides directions to a variety of users. The Mall of America provided a good example of how these techniques, Lynch's and the physical setting qualities, can facilitate the wayfinding abilities of various users. The graphic signage, however, failed to communicate the messages to a wide audience, and consequently was unable to substantiate the architectural signs. Due to the immense size of the mall and the lack of information for the interpretation of the spatial layout, the architecture could not stand on its own to provide directions for those users attempting to navigate through the environment.

Designers of wayfinding systems not only must communicate with varying cultures, but will eventually be dealing with more interactive signage systems as the norm for providing directions. Interactive video screens, hand held directional devices for disabled users, and devices that can speak a variety of languages interactively with the user are such systems that will necessitate clear and more universal communication. Designers will need to understand how signs will be interpreted by various users because not all users are Americans who read and speak English. Already, there is an enormous population of Spanish speaking Americans who cannot rely on the directional signage of the past. The future is one filled with people traveling to other countries, whether by some form of transportation or by computers. For example, designers will be responsible for providing layouts or maps of places on the Internet that should communicate to a variety of users. Soon an international pictographic language may be developed that can be used as an international language for those seeking information on the internet that connects the countries of the world with each other.

A collaborative effort is needed from both areas, graphics and architecture, to provide the universal communication needed in order to accommodate users of more than one culture. By focusing on the denotative meaning and the degree motivation that exists with a sign (the degree to which the signified determines the signifier), and realizing that higher motivation will allow for more universal interpretation, designers can develop effective signage systems that will guide users from varying cultures. If the designer chooses to emphasize the connotative

meaning of a sign in either graphics or architecture, then the opposite area must compensate for the cultural influence that can prevent a user from navigating correctly. For it is through signs and symbols that designers can construct a reality for those who need guidance for making sense of their environment.

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APPENDIX A
DOCUMENTATION CHECK-LISTS

Parking Lots	✔ off	Floor #	Roll #	Shot #	Comments
Graphics:			۱		
Entrance	✓				
Floor markings					
Parking place					
Architecture:					*l-12 parking lot west*
Entrance					*Nevada p5 purple*
Corridors *(?)*					
District markings					
Edges					
Exits			✓		
West End	٠			✓	
Graphics:	✓	3 ✓	۱	12	
Entrance to mall	✓			13	
Directory	✓	✓		14,18	*full ... of Kiosk*
Exit to parking	✓	✓	✓		
Architecture:					*look ... play thr*
Entrance					
Corridor	✓				*v-15*
Restroom (?)	✓			16-7	*Incorrect by ...*
Exit to parking	✓	✓	✓	17	
East End					
Graphics:	✓				
Entrance to mall	✓	2	2	26, 27	
Directory	✓				*Same ...*
Exit to parking					
Architecture:					
Entrance					
Corridor					
Restroom (?)					
Exit to parking					
				2	
Additional photos (look for emergency routes)					
Ext Ent	✓	2	2	28	*Exterior*

West Market	✔ off	Floor #	Roll #	Shot #	Comments
Graphics:	✓	1			
Elevators	✓			27	Gray & *(illegible)*, peel d..x
Escalators	✓				
Floor markings					
Architecture:					green paint, *(illegible)*
Corridor				28	tile, Gur *(illegible)*
Elevator					
Escalators					
Node (into Camp Snoopy) F1					
Node (Market Square)				29	
Landmarks					
Edges to North Garden					
Edges to South Avenue					
District characteristics	✓				
Restrooms (?)	✓				

North Garden	✓	Floor	Roll	Shot #	
Graphics:					Sign *(illegible)* purple
Elevators					
Escalators					
Floor markings					*(illegible)* tile floor
Directory	✓			6	
Architecture:					*(illegible)*
Corridor	✓	2	3	1	
Elevator	✓			5	
Escalators	✓			5	
Node (into Camp Snoopy) F1		2	3	9	
Landmarks	✓	1	3	4	fountain
Edges to West Market					
Edges to ~~East Broadway~~ *(illegible)*	✓	2	3	2	
District characteristics					
Restrooms (?)					
(illegible)	✓	-	3	4	2.

Additional photos (look for emergency routes)

	✓ off	Floor #	Roll #	Shot #	Comments
(illegible)	✓	3	3	10	*(illegible)*
	✓	3	3	11	*(illegible)*
(illegible) Floor	✓	4	3	14	exit

West Market	✔ off	Floor #	Roll #	Shot #	Comments
Graphics:		2rd	1?		
Elevators	✓			26	*five a jell, po" direction*
Escalators	✓				
Floor markings	✓			23	*tile not so.*
Architecture:					
Corridor	✓				*Gnu: fuel tile, Big direction*
Elevator	✓				
Escalators					
Node (into Camp Snoopy) F1	✓				*some as jell*
Node (Market Square)	✓			26	*some so 3rd*
Landmarks					
Edges to North Garden					
Edges to South Avenue					
District characteristics				-	
Restrooms (?)			24		*entrance*
North Garden					
Graphics:					
Elevators					
Escalators					
Floor markings					
Directory					
Architecture:					
Corridor					
Elevator					
Escalators					
Node (into Camp Snoopy) F1					
Landmarks					
Edges to West Market					
Edges to East Broadway					
District characteristics					
Restrooms (?)					

Additional photos   (look for emergency routes)

West Market	✔ off	Floor #	Roll #	Shot #	Comments
Graphics:		3	1		
Elevators	✓			19	
Escalators	✓			14	
Floor markings	✓				1
Architecture:					
Corridor					
Elevator					
Escalators		V			
Node (Into Camp Snoopy) F1	✓	3	V	22	
Node (Market Square)	✓	3	1	19	Tin Slultival
Landmarks					
Edges to North Garden		V			
Edges to South Avenue		V			
District characteristics	✓	3	V	20	
Restrooms (?)			V		

North Garden					
Graphics:					
Elevators					
Escalators					
Floor markings					
Directory					
Architecture:					
Corridor					
Elevator					
Escalators					
Node (Into Camp Snoopy) F1					
Landmarks					
Edges to West Market					
Edges to East Broadway					
District characteristics					
Restrooms (?)					

Additional photos   (look for emergency routes)

East Broadway	✔ off	Floor #	Roll #	Shot #	Comments
Graphics:	✓	3	2	17	ruck → Eng/ Rim (
Elevators					
Escalators					
Floor markings		2-1			F2 Thug
Architecture:					
Corridor	✓				metallic peak, Bl-puics
Elevator	✓	2	2	20,22	pluti
Escalators	✓	2	2	2 ι	ιλ
Node (Into Camp Snoopy) F1	✓	2	2	24	Vert pce
Node (Rotunda)					
Landmarks					
Edges to ~~North Garden~~ Sears Court	✓			29	
Edges to South Avenue					
District characteristics				2 5	ENTR d Edg ppt
Restrooms (?)					
Nell		1	2	23	
South Avenue					
Graphics:					purple styly
Elevators					
Escalators	✓	2	2	3	from grph sch
Floor markings	✓				Carpet
Directory					
Architecture:	✓				left fr stir, faint p.ik]
Corridor	✓	2	2	1	
Elevator					
Escalators		2	2	2	
Node ~~(Into Camp Snoopy) F1~~	✓	2	2	2,5	6 ruck
Landmarks	✓				
Edges to West Market					
Edges to East Broadway					
District characteristics					
Restrooms (?)					
(org props)	✓	2	2	4,7	7 Null ruck
Additional photos (look for emergency routes)	✓	2	2	7	EX
7 Ave North	✓	2	2	9	Entry Rz luth
5 Ave		2	2	10	
5 Ave fire plut on Bar					

Nordstrom court	✔ off	Floor #	Roll #	Shot #	Comments
Graphics:		2	3	-	
Elevators					
Escalators					
Floor markings					Green tile
Architecture:	·	2	3	21,22	many plant
Elevator					
Escalators	۰	2	3 4)	23 24 1	
Landmarks	-	1	4	4	
				2	
Sears court	✔	3	3	13	Directory Ful...
Graphics:				37	white B
Elevators	·				
Escalators					
Floor markings				-	Tile
Architecture:		2	2	30,31	
Elevator					
Escalators					
Landmarks Info Group				33 34	
				32 35	
Macy's court					
Graphics:		1	1		roll ...
Elevators					
Escalators				32	
Floor markings				31	Teleraps
Architecture:					
Elevator					
Escalators		2nd		33	
Landmarks		2nd		35	Interior
		2nd		36	
Bloomingdale's court ✔	✔	flook	roll	shot	
Graphics:					
Elevators					
Escalators	✔	1	2	12	#13 in second floor)
Floor markings				·	Tile
Architecture:	✔	2	2	11	
Elevator					
Escalators				16	
Landmarks					
		3	2	13	
		3	2	15	

Camp Snoopy	✔ off	Floor #	Roll #	Shot #	Comments
Graphics:					
Entrance		1 (1)	4	2,41	N Ave entrance (East)
Directories					
Exits					
Architecture:					
Corridors					
Landmarks					
District characteristics					
Exits as seen from middle of Camp					
Exits					
Escalators from within Camp					
Elevators from within Camp					
Other Arch of Mall from within Camp					
Rest room & exhibit	L	2	2	35	

Additional photos (look for emergency routes)

Node in N Ave		1	4	6	
Elev. Node N Ave		1	4	7	
Inner Entrance		1	4	14	South AVE
Main Entrance		1	4	15	South Ave
Entry entrance		1		16,17	W. market

APPENDIX B
DETAILED ANALYSIS OF EACH SIGN

1. **Architectural sign:** Entrance (Fig. 7)
    Location: entrance to West Parking lot, north side of the mall
    Description of sign: narrow horizontally strong opening going into parking lot.
    Type: index—road leads directly into parking lot, obvious entry, drive right into it, good indication of entrance.
    Plane of expression: concrete columns and slabs stacked upon each other; parallel horizontal slabs of parking spaces; grayish color with identifying purple sign, natural light on three sides of lot; very open.
    Plane of content: drive into on right side, stay to right until turning into a level; U.S. way of stock piling a lot of cars in a small place—no forms of mass transportation to the mall (except for buses) or in our country as a whole.
    Denotative meaning: road leads into lot; stacks of concrete slabs to house cars—protects them from weather; only person who has been in car or driven one in U.S. would understand its function.
    Connotative meaning: place to store many cars in close proximity of mall; protection from weather; conserving space (urban proxemics).
    Cognitive mapping:
        Area sign contributes to: spatial layout—can see different layers of complex; visual access to outside and inside of lot; no barriers to entry—no doors or gates.
        Level of cognitive mapping: entrance and exit of parking lot are transition point before entering the mall on foot—important to provide cues for remembering parking spot; leans toward configurational—as going into lot, enough cues provided to develop basic layout of lot; entrance is expressed by road leading into it and graphic sign above on second level slab.

2. **Graphic sign:** Entrance (Fig. 5)
    Type: directional
    Content: do not enter and enter signs
    Location: on concrete beams of ceiling of parking lot along ramp to get in or out of garage.
    Ease of locating: not very prominent; very thin and horizontal; very close to ceiling.
    Interaction with architecture: emphasizes beam across openings into parking area but white lights in parking lot interfere with white of sign.
    Role in cognitive mapping: aid route learner who follows signs; architecture does not differentiate between entrance and exit.
    Semiotics:
        Text: DO NOT ENTER   7'0" ENTER 7'0"
        Graphic: graphic with do not enter sign, no graphics with enter sign
            Type of sign: graphic is symbol—international symbol for do not enter; red on white background.
            Denotative meaning: red circle cut in half by white stripe
            Connotative meaning: symbolic for "do not enter"; learn meaning through repeat exposure (high convention).
            Degree of motivation: low for graphic
            Universal need: yes, the only indication of entrance and exit to parking area.

3. **Architectural sign:** Entrance (Fig. 7)

   Location: West Parking lot, entrance to mall, fifth level

   Description of sign: space defined by columns and beams; both stairs and elevators are white, either from paint or natural light; "Welcome to Mall of America" reads across underneath ceiling, marking entrance.

   Type: index of entry way.

   Plane of expression: very rigid, geometric boxes; narrow horizontal space emphasized by blue columns and beams with type across top; see stairs and elevator against white background; steel colored elevator doors, concrete steps.

   Plane of content: low ceilings of parking garages; large space of level; dimmed light; vertical movement by stairs or elevators; small posts define pedestrian space.

   Denotative meaning: posts block cars from parking in entrance; two steel doorways or slabs; stairs going up and down but destinations out of sight.

   Connotative meaning: user accessibility for both elevators and stairs; entrance leads to entrance of mall, which is not in sight at the moment.

   Cognitive mapping:

   > **Area sign contributes to:** entrance is differentiated by the fact that the rest of the parking lot has no walls, it's open to natural light, whereas the entrance area has stairs, elevator and wall area.

   > **Level of cognitive mapping:** configurational knowledge of previous stored parking ramps—know that must use stairs or elevator to go to another level to get directly into mall (possibly ground level); beginning parking lot user would have to use English signs to realize the entrance to the mall was this way (also aided by the fact that it is the only place to go); configurational knowledge will aid immensely.

4. **Graphic sign:** Parking (Fig. 6)

   Type: identifying

   Content: P5 WEST Nevada—blue dice

   Location: between two elevators and in parking lots on posts; fifth floor West Parking.

   Ease of locating: prominent on posts and on wall; bright white sign against colored posts—stands out; large sign, almost as wide as post.

   Interaction with architecture: becomes part of post, color coordination and whiteness of sign comes forward; posts painted bright blue.

   Role in cognitive mapping: provides mnemonic cues for identifying parking spot; geared towards route learners as a landmark device.

   Semiotics:

   > **Text:** P5 WEST Nevada

   > **Graphic:** two 3-D blue dice with black dots and shadows.

   >> **Type of sign:** icon and symbol—key symbol of dice for Las Vegas and gambling.
   >> **Denotative meaning:** number and picture for floor identification.
   >> **Connotative meaning:** western state of Nevada; Las Vegas dice.
   >> **Degree of motivation:** low—cultural (key) symbol of Las Vegas; but still can work as identifying graphic.
   >> **Universal need:** no, the dice as a graphic still works even if it is not universal.

5. **Architectural sign:** Entrance (Fig. 11)

   Location: main entrance on north side of mall

   Description of sign: rectangular cut-out of long wall of mall; Mall of America sign towards top; large canopy under sign above multiple doors.

   Type: index—of entrance.

   Plane of expression: rectangular shape cut into wall (indentation); glass and steel columns, metallic coloring; very subdued entrance.

Plane of content: covered entrance; massive sign (logo) up-close, but small compared to surrounding wall; drop-off or pick-up place; entrance to protective cover, escape from outside weather and openness.

Denotative meaning: entry way into mall (stores and Camp Snoopy); a break in the long horizontal wall.

Connotative meaning: way to go from outside to inside or vice versa; reality of real world versus reality of shopping world and another reality of an amusement park

Cognitive mapping:

    Area sign contributes to: building is too large to determine its form (its square shape); outside of building is very horizontal — stretches out to left and right, but inside is a corridor perpendicular to wall — misleading until you are inside.

    Level of cognitive mapping: route learner point of origin; does not communicate enough to build configurational knowledge; provides a landmark or starting and ending point to a route.

6. Graphic sign: Entrance (Fig. 11)

    Type: identifying

    Content: Mall of America logo, stars with swish

    Location: entrance to mall into North Garden from street.

    Ease of locating: not extremely prominent unless driving by mall on north side; see it briefly if looking that direction while going into parking lot.

    Interaction with architecture: sign curves out from flat wall; entrance is tucked in underneath sign; the entrance is not very prominent.

    Role in cognitive mapping: does not act as a starting point for a route unless a person is dropped off or parks in the small parking lot in front of the entrance.

    Semiotics:

        Text: Mall of America — large capital "A" is pointing to star above it.

        Graphic: large star with swish in red, white, and blue, 3-D layering with small yellow stars on underlying white grid.

            Type of sign: icon — star in sky; also, symbol for state on our national flag (key symbol).

            Denotative meaning: multi-colored star with swirling stripe and other stars beneath it; mall name typeset below large star.

            Connotative meaning: grid-like structure of Mid-West; large country composed of many states; large star symbolic of American flag and its colors.

            Degree of motivation: low — very cultural

            Universal need: no

7. Architectural sign: Entrance (Figs. 8 and 9)

    Location: inside walkway; entry into mall, West Market section, third level (also East Broadway second level); (entryways exist on each level in WM and EB).

    Description of sign: four sets of doors (glass) in a glass walkway with glass above and around doors for visual access; double set of doors.

    Type: index — doors and window into mall.

    Plane of expression: four sets of glass doors with West Market symbol etched into top panel of door (in white); glass above doors — can see into mall; doors have silver metallic frames.

    Plane of content: doors to accommodate large flow of traffic; double set of doors controls temperature and airflow inside mall; typical entrance to a mall (multiple sets of doors, usually glass and metal).

    Denotative meaning: entry or passage from walkway to defined space of the mall; retail environment.

Connotative meaning: separates mall from outside world, separates outside world from mall; entrance to place of activity, possibilities of fulfilling needs of purchasing, eating, emotional, amusement, relaxation, pass up boredom.

Cognitive mapping:

    Area sign contributes to: partial visual access to inside of mall; gives indication you are going into mall; when leaving mall, this is seen as area of bright light at end of corridor during the day—definite visual access.

    Level of cognitive mapping: does not create much for route learner other than starting or "entering the mall sequence" which must be recalled upon leaving the mall.

8. **Graphic sign:** Entrance (Fig. 8)

    Type: identifying

    Content: sign for family room four human figures in white on dark background; family of mother, two children, and father.

    Location: first level, West Market entrance/exit to parking garage walkway; on right side of door to room (facing the door).

    Ease of locating: not easy unless facing wall of location.

    Interaction with architecture: right next to doorway into room; wall is plain; door is near column.

    Role in cognitive mapping: would be seen by someone with configurational knowledge—symbol is not used anywhere else; different symbol uses on directory.

    Semiotics:

        Text: none

        Graphic: family stick figures

            Type of sign: icon

            Denotative meaning: mother, father, and two children

            Connotative meaning: "family" of four; ideal of two children with mother and father still together.

            Degree of motivation: high for identifying family, low for indicating nursery which is the main purpose (international symbol used on map).

            Universal need: yes

9. **Graphic sign:** Entrance (Fig. 8—West Market Entrance)

    Type: identifying

    Content: South Avenue near entrance—sign identifying guest services and South Avenue section.

    Location: South Avenue entrance/exit to street, first level.

    Ease of locating: in middle of corridor, but amidst clutter of other signs and difficult to see if looking from center of mall towards exit—light from doors interferes.

    Interaction with architecture: none—in middle of corridor.

    Role in cognitive mapping: identifying sign; ? only used on first level—meant for person to be there to answer questions.

    Semiotics:

        Text: South Avenue, GUEST SERVICES, ?

        Graphic: top hat identifying South Avenue

            Type of sign: ?—index (part of written question) and symbol (international) for information.

            Denotative meaning: English punctuation mark for question

            Connotative meaning: symbol for information

            Degree of motivation: low—native speaker might understand; learned response to ? for information (high convention).

            Universal need: yes

10. Architectural sign: Entrance (Fig. 33)

Location: to Camp Snoopy from West Market first level, South Avenue first level, Sears court second level, North Garden first and fourth levels.

Description of sign: at nodes, must turn into area to see that Camp Snoopy is there; WM—low ceilings, elevator divides traffic, SA—must walk down corridor defined by carpet and columns, Sears— open rectangle with CampSnoopy sign on left, NG (1)—dark corridor, sign for Camp Snoopy obstructed; can see ride, has archway with sign—looks like real defined entrance, but blocked by elevators, NG(4)—large open area viewing into camp, arch across top.

Type: all signs but NG1 are indexical of entrance; NG1 is symbolic of a fort entrance with brick columns like a gate.

Plane of expression: entryways defined by corridors leading to camp or large open areas with elevator in middle or nothing (Sears); NG(4) has largest viewing potential—arch is just like those in South Avenue, though.

Plane of content: mall space is defined by walls and ceilings, camp is defined by lack of walls, high ceiling and lots of natural light; outdoors versus indoors; camp is an activity done outside.

Denotative meaning: corridors define area of walking; NG(4) provides large viewing area (window) and also access to the camp, lanterns on pole mark entrance to camp.

Connotative meaning: NG1 is entrance to fort—arch in camp is similar to that of a fort—bricks, shingled roofs, lanterns, trees, wood poles and railings, and rocks.

Cognitive mapping:

    Area sign contributes to: differentiation—floor tiling alters at edge of camp, lots of natural light pulls people in, directs them; trees, wood, different waste receptacles, architecture is different.

    Level of cognitive mapping: route learner—visual access to camp is limited—only in view when in node if looking towards it, would probably rely on signs to know an entrance is nearby; the only defined entrance to camp is NG1, but it is obstructed visually by elevator; must know that camp is in middle, and also follow signs also.

11. Architectural sign: District (Figs. 12 and 13)

Location: West Market

Description of sign: corridor is very straight, high ceiling, barrel vault roof, thin structural beams in dark green.

Type: symbol of old train station (when looking down corridor).

Plane of expression: rust colored and dull brass railings, dark green columns with ring of lights— have gold trim; criss-cross of pathways connecting both sides of corridor, gray tiling on first and second levels, gray carpet on third; rust and dark checkered areas in node, glass tile walkways on upper levels in node.

Plane of content: long corridor of shops; market place-like carts on first level near node; symbol is sun with face, secondary graphic is cloud; indoor mall—shop after shop along path.

Denotative meaning: lot of open space to areas below.

Connotative meaning: similar to architectural ceiling of an old train station—beams, polls, lights; also like a market place (indoor) on first level.

Cognitive mapping:

    Area sign contributes to: visual access down corridor, straight path, can see node; differentiation—light and dark gray tiling; dark green, rust, and gold colors; groups of lights on each column—repeat in single row all the way down corridor—static rhythm; lots of carts on first level; high ceiling with thin structural beams (multiples); dark green signs.

    Level of cognitive mapping: cues of symbols are not relevant to concept of architecture (neither market or train); corridors to parking do not continue elaboration of details, only use tiling and columns, with two light posts at exit to parking, rest of corridor is bland and undecorated, especially first and second levels.

12. Architectural sign: Node (Figs. 13, 14, and 15)

Location: West Market

Description of sign: node is defined by large circular column, axis for two diagonal pathways, elevators and escalators also at this junction.

Type: icons—functional aspects of architecture—columns, axis point, circular - central; elevators and escalators are indexes for vertical movement.

Plane of expression: circular space; focal point for diagonal and straight pathways; geometric shapes—grids off-set circular form (protrude from columns), tiling is checkered in node in patches to match architecture—circle in column, rectangle by elevators across from circle.

Plane of content: centrality, center from which all things radiate; gathering area (not much activity going on, empty space), large shaft balanced by verticality of elevators on opposite side.

Denotative meaning: resting spot, place for changing direction, provides connecting path across atirum to other side of West Market corridor.

Connotative meaning: see above "content"

Cognitive mapping:

Area sign contributes to: differentiation—added features: becomes a break in the long WM corridor; added architecture (elevators, escalators, and circular column) defines it as a junction point; visual access—can see Camp Snoopy and West Parking at this juncture.

Level of cognitive mapping: most signs are located in this area—route learner; but visual access to other parts of mall (parking and Camp Snoopy) aid configurational learners also.

13. Graphic sign: Intermediate (Fig. 17b)

Type: directional

Content: signs indicating direction to courts, restrooms, parking, guest services

Location: at nodes—coming from Camp Snoopy, parallel with corridor, into West Market and South Avenue.

Ease of locating: easy—right in pathway, hanging from ceiling.

Interaction with architecture: natural light from Camp Snoopy sets color out as strong visual against lighting from corridors; between right angles in architecture; columns act as framing device.

Role in cognitive mapping: helps route learners—indicates direction

Semiotics:

Text: same words as on directories for location names.

Graphic: (see other directional node signs); one sign uses guest services symbol (?) only on first level; secondary graphic is not as noticeable on all signs.

Universal need: no, but those words that are important have symbol with them, like restrooms and guest services.

14. Architectural sign: District (Figs. 20 and 21)

Location: South Avenue

Description of sign: long, straight corridor—can see node (escalators) from court, low ceiling.

Type: symbol for high-class boulevard (indoors).

Plane of expression: coral square columns line up down corridor; cream arches in node; large hanging lights down middle—black and white star shapes; carpet on all three levels; oak benches.

Plane of content: long line of shops—like high-class district; top hat is symbol with crescent moon as secondary graphic.

Denotative meaning: two pathways, one on each side of corridor, connected by right angled walkways; soft lighting.

Connotative meaning: large lights in middle—Hollywood-ish; Rodeo Drive atmosphere, chandeliers could have been better; night out on town: top hat, lighting, colors, and stars—makes you want to get all dressed up.

Cognitive mapping:

Area sign contributes to: visual access can see escalators if looking down middle of corridor; can see second level at all times (except in node), but third level is obscured in most places (it has a curving path); differentiation—coral square posts, carpeting, cream, soft lighting, star chandeliers, third level is one path that curves, silver metallic strips on walkways across corridor, light tan wooden benches.

Level of cognitive mapping: aids configurational more—features to encode that are distinctive from other areas; signs are only in nodes and courts—need to know where you are going and how to get there.

15. **Architectural sign:** Node (Figs. 22 and 23)

Location: South Avenue

Description of sign: node is marked mainly by elevators and escalators—main focus is Legoland; elevators face each other and escalators are behind, centered, near Camp Snoopy.

Type: index for vertical movement.

Plane of expression: elevators are glass, but vertical movement is obscured by floor above; escalators zig-zag—back side of escalators can be seen from Legoland; columns are cream colored in node.

Plane of content: node is diminished to make room for Legoland—play area and store; lot of activity to watch; lego's built into trendy things like space station and dinosaurs.

Denotative meaning: presence of signs indicates decision point for route learners; Legoland in its own space defined by escalators,columns, and edges of South Avenue.

Connotative meaning: this node communicates access to other floors and to Legoland; becomes place of enjoyment and to build ideas from blocks.

Cognitive mapping:

Area sign contributes to: not much differentiation; no corridors to exit mall except on first level; presence of Legoland is mainindication of node.

Level of cognitive mapping: directories available for configurational learners, signs for route learners; more configurational than route.

16. **Architectural sign:** District (Fig. 24)

Location: EastBroadway

Description of sign: long and straight corridor, can see other court from first court.

Type: symbol of trendy, high-tech, arcade of shops; icon of corridor or pathway.

Plane of expression: repetitive circular gray metallic columns straight down corridor on both sides; walkways have bands of light as their structure; lots of tubular neon lights making squares on ceilings; blue bands of color on inside atrium hole walls; gray and white tiles on first and second levels, carpet on third and fourth; some plants.

Plane of content: fourth level has darker lighting—entertainment district; trendy, hip, youth oriented, high-tech reflective surfaces; saxophone as symbol.

Denotative meaning: two paths, one on each side of corridor connected by straight walkways; first level can be seen from second most of the time, third level at times (it curves).

Connotative meaning: arcade feeling; very material, no natural light.

Cognitive mapping:

Area sign contributes to: visual access to courts and to first and second levels and sometimes third, node is not distinguishable until almost in it—too wide of a circle, escalators hidden, but elevators appear more when in corridor; differentiation—aluminum tubes for columns, bands of light as walkways across corridors, blue bands of color in atrium holes, artificial light, gray and white tiles, aluminum railings, lots of neon signs.

Level of cognitive mapping: aids configurational more—no signs in node, escalators out of view when in corridor, second and third levels similar except for occasional curving and carpet on third .

17. **Architectural sign:** Node (Figs. 25)
    Location: EastBroadway
    Description of sign: large rotunda—circular column that comprises entire node; one side of rotunda holds elevators, other side holds escalators and views into Camp Snoopy.
    Type: icon of vertical movement.
    Plane of expression: large circular space—four floors, metallic silver columns extend three stories; escalators criss-cross, made of reflective surfaces; glass elevators; lots of grays and blues; circular tile echoes rotunda—large circle of tile on first level encompassing area.
    Plane of content: large gathering place, can observe from above, place of activity or action.
    Denotative meaning: vertical movement, large viewing area into rotunda.
    Connotative meaning: place for changing direction of path; place to observe various activities; large pit, like coliseum.
    Cognitive mapping:
        Area sign contributes to: visual access to East Parking and Camp Snoopy once in node; visual access of vertical movement; differentiation by circular format versus straight line of corridors.
        Level of cognitive mapping: configurational—node, access to Camp Snoopy and parking, halfway between two courts, presence of directories; no signs in node—only know arrival at decision point by various routes available.

18. **Architectural sign:** District (Figs. 26 and 27)
    Location: NorthGarden
    Description of sign: path curves, cannot see node or other court.
    Type: symbol for garden
    Plane of expression: sand colored tiling, lots of "window-sill" plants, trees, flowers, trellises, gazebo (with seating), umbrellas in food court on third level, small hanging lights (very soft), lots of natural light, rafting exposed on ceiling, variety of circular columns (very thin to medium size), rhythm provided by uniform tiling on all three levels (some carpet on third level).
    Plane of content: very natural walk through garden and shops at same time, lighting changes with seasons and time of day, place to enjoy a meal or snack in a gazebo or on patio.
    Denotative meaning: second and third level visible from first; not a straight path—most gardens have winding paths, with gazebos at corners in the path.
    Connotative meaning: brick walkways in a large "outdoor" garden.
    Cognitive mapping:
        Area sign contributes to: visual access limited down corridors, but vertical access is good; differentiation—sandy bricks/tile, off-white architecture, no straight rhythm of columns, lots of trees and plants, trellises and gazebos, umbrellas, lots of natural light, lots of benches down middle of first level corridor, has fountain.
        Level of cognitive mapping: aids configurational more—route learners will be guessing where they are until come upon signs in node, which is not in total view from last sign in last court.

19. **Architectural sign:** Node (Figs. 26 and 28)
    Location: NorthGarden
    Description of sign: node is composed of one elevator, escalators beside it on first level; escalators go diagonal on second to third level; mostly the large space defines it; Golf Mountain is on third level.

Type: index of vertical movement, especially elevators; second elevators more iconic.

Plane of expression: lots of plants and trees, umbrellas in food court, natural light, garden trellis, suspended potted plants, awnings over food services; large space—wider than corridors—emergency exit doors very prominent—large cubby hole in wall.

Plane of content: path becomes plaza with directory and access to vertical movement; node provides place for emergency exit on second floor—bright light behind doors would suggest it leads outside.

Denotative meaning: access to Camp Snoopy not visual.

Connotative meaning: elevator enclosed with glass like a greenhouse—has gazebo/garden architecture framework; third level is like a garden cafe.

Cognitive mapping:

    Area sign contributes to: access to Camp Snoopy is not visualized until directly in node on first level; sign directs you, but architecture does not; elevators are also not in view from corridor.

    Level of cognitive mapping: more towards route learner; architectural aspects do not communicate well, but configurational learner would know about location of elevators in node on first level; this node is not as distinct, also other structures along corridor that would suggest a node—visual access of node from a court is not possible because path curves.

20. Architectural sign: Node (Fig. 29)

    Location: Bloomingdale's court

    Description of sign: wide octagonal atrium, thin columns or posts, small palm leave plants (sparse), dark wooden benches (numerous), piano not in use.

    Type: icon of an atrium.

    Plane of expression: cream-colored architecture, natural light mixed with gold reflections from railings, warm light, coral and cream tile, escalators in middle (as in Macy's) only to second level, few signs or graphics.

    Plane of content: sophistication, elegance, simplicity, place of rest, very open.

    Denotative meaning: Bloomingdale's sign on wall/ledge across corridor of South Avenue (this part is not on actual store facade), cream grid-blocked walls around atrium by store.

    Connotative meaning: reference to upper class, benches have Indian influence, open area for conversation (will not block traffic, like a plaza).

    Cognitive mapping:

        Area sign contributes to: visual access to above levels and to next corridor and back the way you came.

        Level of cognitive mapping: configurational—corner of mall, making a square as going around the mall; signs placed at edges for route learners.

21. Architectural sign: Node (Fig. 30)

    Location: Macy's court

    Description of sign: atrium with palm trees and hanging plants around atrium opening walls.

    Type: symbol for suburban street in California; lots of greenery, yet very open; soft natural light, with street lamps; early 20th century style.

    Plane of expression: dark sand colored tile on floor, trees in round planters, lamp posts with three bulbs, lights also on columns around perimeter, hanging plants cover all of atrium hole wall space or ledge.

    Plane of content: west coast plants and artificial lights.

    Denotative meaning: not many resting places or seating; provides sense of openness, lets in natural light, visual access to above levels.

    Connotative meaning: resting space, atrium—opens up area, relaxes as compared to no openness; allows eye to rest.

Cognitive mapping:

> **Area sign contributes to:** visual access to above levels, acts as buffer zone between West Market and South Avenue; differentiation from more plants, white architecture, dark sandy tiles, natural light.
>
> **Level of cognitive mapping:** configurational—Macy's is at corner of mall, only signs at edge of court/corridor would help route learners.

22. **Architectural sign:** Node (Fig. 31)

   Location: Nordstrom court

   Description of sign: atrium; lots of trees, fish pool, Nordstrom name is on top level in large type, roof (skylight) forms angled roof top, like a barn.

   Type: symbol for arboretum, index of court.

   Plane of expression: large thin-leafed palm trees, trees with round benches around them (white), pool that has fish—ledge is low enough that small children can peer in and touch water, escalators in green—blends in with trees and pool.

   Plane of content: peaceful area that can be used to take a break in a park-like situation, lots of sunlight and live plants and flowers; interweaving paths, numerous places for pausing and would not be in middle of open space.

   Denotative meaning: soft gray tiling, bricks and colored stone for arboretum architectural qualities; area that holds a fish pond with water and lots of trees to set up a different type of space.

   Connotative meaning: arboretum; more of a break place from the mall—stores become obsolete—new spatial reality in this area, no longer in mall, but in park or arboretum.

   Cognitive mapping:

   > **Area sign contributes to:** view towards next corridor is obstructed, court becomes an alternate space quite different from rest of courts; differentiation through tiling and plants, but does tie in with North Garden theme (just different colors and more congested).
   >
   > **Level of cognitive mapping:** configurational, signs are only observable at edges of court, which are not visible when in the court; directions stand out somewhat.

23. **Architectural sign:** Node (Fig. 32)

   Location: Sears court

   Description of sign: atrium; escalators hidden going to first level, in middle of atrium going to third level from second.

   Type: index of an atrium—its function is somewhat displaced by escalators going to third level.

   Plane of expression: very white architecture, few plants, trees here and there, gray matte railings, white benches (very few, only on upper levels); escalators block natural light to first level; race car roped off in center on first level; gray and blue square tiling.

   Plane of content: viewing area for thing (car) roped off in center; does not appear as a cohesive unit like rest of courts; Sears cannot be seen from corridor—not prominent like Macy's or Bloomingdale's.

   Denotative meaning: first level has large open space, hides escalators from corridor view (these go directly to entrance to Camp Snoopy on second level); atrium not visualized until in it.

   Connotative meaning: very plain; varying amounts of light; too open to act as resting place—not enough objects; Sears not viewed as high-class store, neither is feeling in court; not very habitable or inviting, not drawn to it from corridor.

   Cognitive mapping:

   > **Area sign contributes to:** visual access poor from corridor, atrium not visible, nor is Sears or escalators to second level; differentiation by tiling and plainness of white features.
   >
   > **Level of cognitive mapping:** not prominent enough to fall into configurational coding or route, not many memory cues, Sears is too tucked away to remember that it is

there; signs help configurational more—destinations on signs are far away, half way down corridor and general; directories also in courts.

24. Graphic sign: Directory (Figs. 13, 15, 25, 26, and 30)

    Type: directional

    Content: directories contain symbol of section, five maps (four small, one enlarged of level on), key to symbols, store listings—all on one side, maps oriented in direction facing, maps have you-are-here arrow.

    Location: in nodes and courts by escalators and elevators.

    Ease of locating: easy—pedestal about 11 feet high, can sometimes blend in with surroundings, though; light attracts in darker areas.

    Interaction with architecture: not much, in middle of corridor but off main path so will not cause congestion.

    Role in cognitive mapping: provides basic layout of mall for configurational learners, finding exact location of store is vague—numbers of stores listed in a group for a general area (shape) of map, like W358<W331; map not conducive for route learner—no landmarks drawn in, symbols congested down a corridor (actually all in same location).

    Semiotics:

        Text: upper and lower case letters, Gill Sans font

        Graphic: sun with cloud and stars behind (WM); flower with butterfly, flowers, and ladybugs (NG); saxophone with partial sun (EB); top hat with crescent moon and stripes (SA); Mall of America logo (courts).

            Type of sign: icons; logo is index

            Denotative meaning: personified sun; flower; saxophone (musical instrument); top hat with stick or line through it (gestural quality in line).

            Connotative meaning: creative, gestural sun with abstracted facial qualities (almost unappealing)—not highly motivated with a market, energy bolts for sun rays—hip feeling; flowers and bug of a garden—spring time, earthy, natural; saxophone—jazz music, very hip or cool, blueness denotes cool color; top hat—upper class, formal, 1920s.

            Degree of motivation: sun with WM—low, not enough natural light to associate with sun; flower with NG—high, direct association of flower with garden (English tradition); saxophone with EB—low, Broadway known for musical theater, but association is not direct; top hat with SA—low, but no direct association.

            Universal need: yes—need symbols for sections on map, text or color coding is not enough.

25. Graphic sign: Intermediate (Figs. 15, 17a, and 22)

    Type: directional

    Content: signs directing to courts, restrooms, parking, Camp Snoopy.

    Location: nodes, all levels and sections.

    Ease of locating: fairly easy, large block of color allows white type to stand out.

    Interaction with architecture: hangs from ceiling by two rods, either directly in path or off to right of path; height is about 11 feet to bottom of sign from floor.

    Role in cognitive mapping: geared towards route learners—indicates direction at a junction, most signs are in sight of a directory (for configurational learner).

    Semiotics:

        Text court names, parking names, restrooms

        Graphic: arrows, secondary symbols in gold from section identifying graphics (on most signs); symbol for restrooms and handicapped.

            Type of sign: icons—crescent moon (SA), butterfly (NG); index—part of cloud (WM), part of sun (EB), arrows; signs are color coded.

Denotative meaning: moon, butterfly, puffy cloud with lines, arch with rays (one quarter of a sun), male and female stick figures, person using wheelchair, arrow—direction.

Connotative meaning: moon—night, stars, theatrical; butterfly—outdoors, springtime, flowers; cloud—wind (lines), air, flight; sun—brightness, heat, peeking; M/F figures—man and woman (stereotypes), symbol for restrooms; handicapped—symbol for accessibility for those in wheelchairs (all things should be accessible, symbol may be redundant).

Degree of motivation: moon—high, but for SA it is very low; butterfly—high as sign, high for garden association of NG; cloud—low association with WM; part of sun—low for symbol of EB; M/F low for symbol of restroom, high convention; handicapped—high for accessibility, low for restroom; arrows—high, also high convention.

Universal need: yes for restrooms; sections names could be more universal if symbol was incorporated more on maps; arrows are inconsistent—some signs have arrows for each listing, some have it in groups, one sign has smaller arrow for second list of two going in the same direction.

26. Graphic sign: Intermediate (not pictured)

Type: directional

Content: Sears and East Parking and restroom directions

Location: above food court in North Garden on third floor (on east side of node).

Ease of locating: easy—pink sign stands out from beige and green surroundings.

Interaction with architecture: hangs below horizontal beam in pathway of corridor.

Role in cognitive mapping: geared towards route learners—lists destinations that are not within site—arrow pointing down (meaning back) to restrooms can be confused for going down to second level; route learner would have to look for additional signs, configurational learner would remember from the directory map.

Semiotics:

Text: up arrow Sears and East Parking; down arrow Restrooms with symbols.

Graphic: restroom and handicapped symbol, butterfly—secondary symbol for North Garden.

Type of sign: symbol (restrooms), icon (handicapped), index for garden.

Denotative meaning: male/female; person using wheelchair; flying butterfly with path drawn behind it.

Connotative meaning: restrooms (high convention); wheelchair accessibility; butterfly flying through the garden.

Degree of motivation: high, low, low

Universal need: yes, for restrooms especially

27. Architectural sign: Landmark (Fig. 16)

Location: Camp Snoopy, Snoopy Bounce, by West Market node

Description of sign: big balloon of Snoopy, small children can bounce inside at base; balloon bobbles up and down slightly from kids bouncing; is wearing a red handkerchief around neck and green backpack; is waving with right paw, very cute, also has its own red water dish with real water in it.

Type: symbol of cartoon character; dog, key symbol, has existed for a long time, creator Schulz was from Minneapolis.

Plane of expression: large dog with backpack, bouncing slightly up and down; dog is a beagle with white fur and black ears.

Plane of content: from East Broadway looks like a dog emerging from the forest of trees, waving to people in West Market; U.S. fondness for daily comics in newspaper, form of entertainment and light reading and humor.

Denotative meaning: amusement ride for children, faces West Market, can be seen from East Broadway node and partially from other nodes.

Connotative meaning: attraction for children, creates a meeting place, water dish is like watering hole; acts as a symbol for the camp.

Cognitive mapping:

    Area sign contributes to: creates a reference point (visual access) for West Market.

    Level of cognitive mapping: geared towards configurational learners, only on Camp Snoopy maps but should be placed on directory maps.

28. Architectural sign: Landmark (Fig. 16)

    Location: South Avenue General Cinemas fourth floor sign

    Description of sign: large horizontal sign

    Type: symbol for product of Hollywood entertainment.

    Plane of expression: General Cinemas in white lettering, stands out against dark background; pink arch (thin); lots of yellow stars.

    Plane of content: place of entertainment; watch movies on big screen; big industry in U.S.; "Hollywood".

    Denotative meaning: can be seen from Camp Snoopy and third floor SA food court; only graphics near ceiling inside camp.

    Connotative meaning: stars symbolic for Hollywood cinema, but does not communicate that "theaters" are in this location (needs film strip or something).

    Cognitive mapping:

        Area sign contributes to: only visual cue when looking into Camp Snoopy where South Avenue is; this fourth floor cannot be seen from third floor in South Avenue—would not know it existed unless looked on directory map.

        Level of cognitive mapping: configurational—know where cinemas are in South Avenue, can orient yourself, will know where you are in camp; helps people who know cardinal directions well; no signs tell direction to cinemas—only on directory maps.

29. Architectural sign: Landmark (fig. 28)

    Location: Golf Mountain, third floor North Garden

    Description of sign: miniature golf, has same light fixtures as Camp Snoopy.

    Type: symbol of garden architecture; but not strong symbol from a distance.

    Plane of expression: elevator emerges on one end of mini-putt area—looks like part of Golf Mountain; lots of rocks and plants.

    Plane of content: mini-putt—golf for all ages and all levels of skill; popular form of entertainment or recreation.

    Denotative meaning: hilly and outdoor like typical mini-putt range

    Connotative meaning: outdoor landscape but can be played all year round since it is indoors; form of recreation.

    Cognitive mapping:

        Area sign contributes to: not well noticeable from Camp Snoopy or other nodes— elevator and large trellis (arch) provide more of a reference; visual cue not strong for cardinal directions—does not project from wall like General Cinemas sign, but recedes back into pocket in the wall of Camp Snoopy.

        Level of cognitive mapping: configurational

30. Architectural sign: Landmark (Figs. 25, 14, and 23)

    Location: East Broadway rotunda, West Market large column in node, Legoland in South Avenue, food courts (not as focused, more spread out); circular and square trellis in North Garden.

    (see previous analysis)

119

Plane of content: focal points in the pathways—Legoland and East Broadway hold forms of enjoyment or activity to watch.

Cognitive mapping:

Area sign contributes to: all three cannot be seen from Camp Snoopy—Legoland must be seen at exit to South Avenue; can only be used as landmarks within the districts; rotunda varies with its contents—architectural features are memory cues; Legoland is in its own space sanctioned off by architectural features; West Market is constant—part of architecture and surrounded by carts.

Level of cognitive mapping: Legoland is on directory map and so is rotunda; geared towards route learners, especially Legoland and rotunda since they are on maps.

31. **Architectural sign:** Secondary landmark (Figs. 27, 31, and 34)

Location: NG circular fountain, has pennies in it; fish pool in Nordstrom court; Warner Brothers store front mannequins (characters)

Description of sign: NG circular Italian Renaissance fountain, blue tint to water; fish pool is ameba shape, has big green fish; WB Bugs Bunny, Sylvester and ? standing around green column on side of path (one of the existing columns in the row in WM).

Type: symbol; index; symbol

Plane of expression: NG—small, in middle of corridor on first floor; fish pool—middle of court, occupies most of it, dark stone around it, curved stone, can lean on it easily; WB molded figures common of WB characters.

Plane of content: NG—resting place; fish pool—can feed fish, relaxing place; WB cartoon characters life-size advertising store, source of entertainment and humor (not on television as much anymore, though).

Denotative meaning: NG—can sit around ledge of pool, not deep (maybe 6"); fish pool—small ledge so children can see in and feed fish; WB life-size figures decorating column.

Connotative meaning: NG—fountains or pools in gardens, common feature; Fish pool—part of arboretum, common feature; WB figures around column like Gothic cathedrals have figures in portals and facades.

Cognitive mapping:

Area sign contributes to: provide landmarks for those who walk by one time, may remember it again later as a reference point—none are displayed on any maps or signs.

Level of cognitive mapping: at least second level.

32. **Architectural sign:** Edge (Fig. 23)

Location: Legoland, first floor South Avenue

Description of sign: Legoland is in its own space created by large columns or pillars and change in carpeting; also a walkway between Legoland and Camp Snoopy.

Type: index for a boundary—two areas separated by architectural features.

Plane of expression: large cream colored square columns with black base, line up with multi-colored carpet edge of Legoland; corridor carpet is solid dark brown color along edge; walkway has arch underneath.

Plane of content: play area separated from flow of traffic; walkway allows for observation without being in the way.

Denotative meaning: creates path to Camp Snoopy around Legoland—keeps traffic out of central area.

Connotative meaning: corridor is like cathedral layout—nave in center (Legoland), sides of nave created by columns with space on other side; area of activity in nave section.

Cognitive mapping:

Area sign contributes to: edge defines space of play and space of walking (spatial layout).

Level of cognitive mapping: aids both configurational and route learners by directing their path.

33. **Architectural sign:** Edge (Fig. 33)
    Location: Camp Snoopy and West Market edge
    Description of sign: edge is a semi-circle with two large dark green columns.
    Type: index of an entrance; it physically is an edge, but indexical of an entrance to Camp Snoopy.
    Plane of expression: gray tiling of West Market is juxtaposed with gray stones (semi-circle, about 2 ft. wide), then tan color of Camp Snoopy floor; columns and flower boxes are at edge also, right on dividing line.
    Plane of content: edge is defined by different floor surfaces—very literal.
    Denotative meaning: marks beginning of Camp Snoopy and end of West Market.
    Connotative meaning: stepping from one spatial reality (the mall) into another (amusement park).
    Cognitive mapping:
    > **Area sign contributes to:** edge is mostly defined by differentiation in tiling, cluster of trees also indicates different district; edge is clear from second and third level.
    > **Level of cognitive mapping:** on first level, ceiling height and light may be more dominant than change in floor, depending on person's point of view.

34. **Architectural sign:** Edge (Fig. 32)
    Location: Macy's, Bloomingdale's, Sears, and Nordstrom court edges
    Description of sign: architectural features, signs, and floor tiling mark edge.
    Type: icon—architecture functions as an edge between two areas.
    Plane of expression: amount of light in courts is much brighter—natural light from skylights, tiling changes color and pattern, floors above create an archway under which to pass, sign placed on edge to mark new district.
    Plane of content: creating boundaries between different areas of space in the mall, one is walking and shopping space, the other is a space of rest or pause.
    Denotative meaning: forms a place for a natural break between two districts.
    Connotative meaning: bustle of mall and shops, park-like area for rest in its midst, like parks in a big city.
    Cognitive mapping:
    > **Area sign contributes to:** creates small diversion or break between two sections of the mall; lets people know when they have reached the end of one section and are about to enter another.
    > **Level of cognitive mapping:** signs at edge aid route learners, also aids configurational—know when entering new part of mall.

35. **Graphic sign:** Intermediate (Figs. 20 and 24)
    Type: directional
    Content: signs identifying section of mall and possible destinations if going down corridor.
    Location: at edges of courts into mall section.
    Ease of locating: NG and SA—easy, corridors plain and signs stand out; EB and WM—more difficult, corridors very active and blend in with surroundings.
    Interaction with architecture: NG and SA in pathway to corridor, EB and WM in center of corridor in front of open well in floor—not in direct path.
    Role in cognitive mapping: route learners—signs point to court on opposite end; more towards configurational learners—will know where they are if they know where all courts are.
    Semiotics:
    > **Text:** title of section entering, listing of destinations, but not in order of appearance; also not directing people to closest access to Camp Snoopy which is sometimes in court (Sears).

Graphic: same as on directories, arrows

      Type of sign: index of direction

      Denotative meaning: up, right, left

      Connotative meaning: forward, to your right, to your left.

      Degree of motivation: mixed, high, high

      Universal need: no, but symbols would help; spacing is off in type blocks—too tight at top of listings; type could also be bigger, along with arrows.

36. **Graphic sign:** Elevators (Figs. 36 and 37)

    Type: procedural

    Content: close-up of buttons to call elevator, two elevators.

    Location: buttons—South Avenue node second floor, on the right side of the elevator (elevators are facing each other); two elevators in East Broadway node, side by side, second floor.

    Ease of locating: elevators easy to locate, signs sometimes blend in with surrounding wall surfaces (EB); easy to locate in SA.

    Interaction with architecture: stuck on wall, 3-4 ft. off floor.

    Role in cognitive mapping: will take person to different level; directional signs around elevators do not indicate if something is on upper or lower level.

    Semiotics:

        Text: "NOTICE/THIS ELEVATOR IS FOR PASSENGERS ONLY/NOT FOR FREIGHT"; "In Case Of Fire Elevators Are Out Of Service"; "Use Exit".

        Graphic: up and down arrows; two negated symbols indicating do not use elevator and a symbol of someone running down stairs—all three in three red flames; two circular lights by elevator.

        Type of sign: icons; arrows index of vertical movement; circles are symbol of going up or going down.

        Denotative meaning: up and down arrows, negation of pushing button, negation of standing in box, run down stairs, circular lights.

        Connotative meaning: buttons to push if want to go up or down floors in elevator, do not push buttons or get in elevator during a fire—use stairs (run?); lit circular light means elevator is going up or going down.

        Degree of motivation: high for buttons, high for symbols, low for light indicators (circle not as clear as an arrow would be—use of symbol from directory would help).

        Universal need: yes

37. **Graphic sign:** Exits (Fig. 9)

    Type: directional

    Content: signs directing to restrooms and parking.

    Location: West Market exit to parking third level; East Broadway exit to parking second level.

    Ease of locating: not easy, area is dense with images and signs; interference from natural light of walkways behind signs.

    Interaction with architecture: hangs down from ceiling in center aisle of two pathways, difficult to read from a distance and from bright light from walkways; placement differs in each area—WM, behind WM sign; EB, in front of it and covers exit sign; architecture does not indicate restrooms if standing back down corridor from sign (too many columns in EB).

    Role in cognitive mapping: aids route learners; configurational learners would already know that the parking lot is straight ahead.

    Semiotics:

        Text: Restrooms, East or West Parking

        Graphic: same as other directional signs, although no secondary graphics used; graphic from identifying signs almost interferes with directional sign when viewing from a distance.

Type of sign: icons; arrows index of vertical movement; circles are symbol of going up or going down.

Denotative meaning: up and down arrows, negation of pushing button, negation of standing in box, run down stairs, circular lights.

Universal need: yes, exit signs placed in wrong spots—would place one on each side of identifying sign, then they would be in direct paths.

38. **Architectural sign:** Emergency exits (Figs. 19b and 35)

Location: NG node second floor, EB node into Camp Snoopy second floor, WM node by Camp Snoopy access.

Description of sign: double door or two double doors with push-bar handles, open towards outside and not in.

Type: index of exit—passageway to other side, must open door.

Plane of expression: doors set back in own alcoves, exit signs above, architecture creates frame around the doors, architecture is also very plain—sets it apart from rest of mall.

Plane of content: exit to outside of mall in case of emergency; otherwise, not to be used by customers.

Denotative meaning: escape route to accommodate a mass of people in order to save lives if necessary.

Connotative meaning: multiple exits for mass of people, creates sense of security since other exits are not always in view (rarely in view, actually); in compliance with codes and standards for public spaces.

Cognitive mapping:

Area sign contributes to: visual access if standing in view of it, signs are plenty and direct to it; differentiation—architecture around exit is much plainer than mall's architecture.

Level of cognitive mapping: for route learners, follow path in case of emergency; configurational would not keep this information in mind, too many exits, and do not appear on any maps.

39. **Graphic sign:** Emergency Exits (Figs. 19b and 35)

Type: procedural

Content: emergency exits and exit signs, TDD telephones and pay phones

Location: second floor West Market node by access to Camp Snoopy, fourth level East Broadway node, second level North Garden node, East Broadway node into Camp Snoopy second floor.

Ease of locating: easy, plenty of red exit signs, very plain architecture (almost too many in some places, though).

Interaction with architecture: walls plain, like white or cream color, phone signs can only be seen from one direction—hang out from wall; East Broadway second level—cannot see phones or sign at all from across corridor; if not looking straight on at exit, only sign indicates its presence—tucked away into walls.

Role in cognitive mapping: signs for phones are not consistent with symbols on directories and maps; TDD symbol not seen anywhere—may confuse wayfinders; these exits are not shown on maps, only for emergency or authorized use.

Semiotics:

Text: Exit signs, "Phone" over phone graphic for signs, U.S. West (sponsor), "Authorized Personnel Only" on doors.

Graphic: phone receiver, Exit in bright red

Type of sign: icon (phone receiver)

Denotative meaning: telephone receiver

Connotative meaning: telephone, means of communication

Degree of motivation: high, but low for TDD phones.

Universal need: yes

40. **Architectural sign:** Exit—Parking Lot (Fig. 5)

    Location: West Parking lot, exit ramp

    Description of sign: ramp under a roof, exit is down a ramp towards the natural light.

    Type: index of exit—driving straight out of parking lot towards ground level.

    Plane of expression: long ramp, divided road, both directions of travel, can enter into parking areas at various levels, natural light indicates "outside", structure is concrete.

    Plane of content: social custom of a parking garage—many have circular exits, this one combines entry with exit on same ramp.

    Denotative meaning: long corridor to exit and enter parking lot, with access to parking lots on various levels.

    Connotative meaning: ramp acts as diagonal intersecting parallel levels of parking lots, like pyramid form.

    Cognitive mapping:

        Area sign contributes to: ramp only allows one way in or out—during busy times, traffic directors are there telling you where to go.

        Level of cognitive mapping: more towards route learners, configurational knowledge is learned through continuous or multiple exposure.