PROHIBITION IN SYMBOL COMMUNICATION

THESIS

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By

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Literature in semiotics lacks consideration of the elements in symbols that communicate specific concepts. Prohibition was the concept chosen for study. Potential prohibitors were represented by line configurations superimposed on background symbols. Seven prohibitors coupled with symbol backgrounds to form 49 experimental symbols were studied through a symbol inventory. Prohibitors constituted the independent variable, while dependent variables were verbal responses by 105 college students to the experimental symbols. Two hypotheses were tested: a) Prohibitors differ in effectiveness in communicating prohibition and b) Prohibitors differ in frequency of distortion of symbol meaning. Chi square analyses and comparisons of proportions showed diagonal lines most frequently elicited prohibition responses. A chi square analysis displayed no significant relationship between prohibitors in distortion of symbol meaning.

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PROHIBITION IN SYMBOL COMMUNICATION

The most common means of communication is language. Sometimes that communication is spoken, sometimes written. However, there are situations when verbal communication is not economical or efficacious. In such instances, various forms of nonverbal communication are used. Visual symbols are included in this category. For example, traffic signs are more quickly comprehended by passing motorists than written messages. Persons suffering from cerebral palsy and other persons handicapped in verbal communication turn instead to symbol systems devised for their use. In places such as airports where people with different language backgrounds use facilities, symbols direct them to food service, restrooms, and newsstands.

The need for such a universal symbol system is clear. In their paper presented to the International Conference on Visual Literacy, Earl and Marilyn Clark stated:

> Symbols are not only essential to living, but our actions themselves are symbolic systems and they are learned from symbolic systems. Intellect is that condition resulting from experiencing and the intellect is encoded and retrieved by the use of symbols. Thus basically we are symbol seeking and

> symbol generating creatures. It is true that mankind is primarily language oriented but also shares with other creatures nonlingual intellect. (Clark and Clark, 1976, p. 6-7).

Determining the process by which an individual generates a symbol for a meaningful event has been the object of study in the area of visual literacy. Clark and Clark (Clark and Clark, 1976), in their model of visual literacy, state that perception is the basis of communication. The development of the visual symbol, or in their terms, the quantitative symbol, occurs when an individual codes qualities of a particular experience which cannot be put into language. These qualities represent the individual's nonlingual knowledge. The individual's concept of the experience is a pattern of meaning which has the potential for acquiring associations. Even as the electrochemical coding process that translates the experience into a symbol place, the symbol may "grow" in its meaning. As a concept matures in the mind of the individual, the symbol associated with the concept grows in its number of associations.

This theoretical conceptualization is similar to Lashley's concept of the engram or memory trace. The symbol is, however, a nonverbal engram. It is also a unit which triggers meaning for associated concepts. Whereas

an engram is considered to be a singular event, a symbol is an economical unit which, when considered individually, may be referred to as engrams. In a comparison of the symbol and the engram, a symbol may be considered a pattern of engrams.

To arrive upon a standard symbol language, it is not enough to discover how one individual learns his or her unique set of symbols. It is necessary to investigate the symbols that are held in common across individuals. Proponents of visual literacy suggest that if there are universals in verbal language, there should be universals in visual language as well (Hortin, 1980).

Visual universals are particularly important in the science of audio-visual communication. Clark and Angert (Clark and Angert, 1980) cite Knowlton as decrying the "...lack of a carefully described unit of analysis, specifically, the pictorial icon." (p. 2). Clark and Angert performed a meta-analysis of the complexity of the pictorial stimuli. The studies included in the analysis represented two differing positions on the issue of stimulus complexity, the realism and "relevent cue" hypothesis.

The realism hypothesis, espoused by Hoban, Carpenter, Dale, and Miller, (cited in Clark & Angert, 1980) holds that visual symbols are most effective when they correspond

closely to actual experience. It is grounded upon the stimulus generalization principle of stimulus-response learning theory. The individual identifies the symbol with its object referent more easily when the symbol includes a great amount of detail. The more complex the symbol is, the easier it is to accurately identify.

The "relevant cue" hypothesis, on the other hand, is based on channel theory and is congruent with the theories of perception held by Broadbent and Travers (as cited in Clark and Angert, 1980). A central concept of channel theory which is relevant to pictorial identification is the idea of the perceptual system being a single, narrow path. This path can accommodate only one source of information at a time. That is, the central nervous system processes a wealth of stimuli to simplify them into the relevant, essential details necessary to retrieve the concept out of the memory. A symbol which contains the essential details necessary to trigger the original concept with which it is associated will be more effectively and efficiently identified than a complex, detailed symbol.

The testing of both these theories presents a problem in controlling an element in the subjects' response set which is referred to as thematic complexity. That problem is the person's subjective impressions of a symbol being more influential than the actual physical qualities of the

stimulus in the process of identification and labeling. Angert and Clark deal with this factor only briefly, first introduced by Duchastel and Waller (as cited in Clark and Angert, 1980). They state that it is very difficult to control for the set of associations, affective and cognitive, that an individual being tested brings to the stimulus situation as part of his or her response set. Research has been done to investigate subject preferences and pictorial complexity. Clark and Angert, however, feel that equating preferences of a subject for particular design details with the effectiveness of those details in communicating a concept is a fallacy.

There are other approaches to studying symbol identification that de-emphasize individual differences in response set. One approach addresses the task of discovering those elements which constitute a symbol that communicates its message clearly. VandenBergh and Sentell (VandenBergh and Sentell, 1979) suggest four criteria for a symbol that is effective in its ability to communicate a concept. First, the symbol must be unique. Second, it must be clear in meaning. Thirdly, its meaning must be understandable apart from the language or the culture of the environment in which it appears. Finally, it must be visually direct, not requiring a long exposure time to interpret. The idea behind this approach is to stress the universality of the

symbol as the single most important attribute. Whatever the symbol is thought to communicate by consensus is accepted.

The International Committee for Breaking the Language Barrier offers the following ten criteria. a) Is it easy to associate the symbol with its message? b) Does it fit different cultures and different local situations? c) Does it fit changing times? d) Is the symbol pleasing and acceptable without controversy? e) Does it conform with existing international standard symbols or their elements? f) Is the symbol or its elements capable of systematic application for a variety of interrelated concepts? g) Is it easily reproducible and applicable for many different purposes? h) Is it distinguishable from other symbols? i) Can it be perceived from different distances and angles, under different light conditions? j) Can the symbol withstand vandalism and contamination? (VandenBergh & Sentell, 1979).

The International Organization for Standardization (ISO), the International Committee for Breaking the Language Barrier, as well as limited interests groups like the International Civil Aviation Organization and the International Road Federation, have made attempts at worldwide adoption of a limited set of symbols. However, the utility of international, conventional style graphics

outside the context for which they were designed has been questioned by Jeremy Bratt, a graphics designer. Bratt developed a set of pictorial illustrations for use by illiterates and foreign language speaking individuals on prescription labels for medications issued by an opthalamic ward in London's Whitechapel Hospital. His contention was that the international symbols already in use are too complicated, inhuman, and insensitive to be used in the medical field (Bratt, 1978). It is clear the need for communication at the most basic levels of understanding is not being met with the symbol systems that are currently available.

Semiology or semiotics is the science of signs which represent ideas or words. A most ambitious work in this area was done by Dreyfuss (1972). He describes himself as in the process of collecting symbols from every academic and professional discipline around the world to include in a computer bank as the basis for a potential, international symbol language. Other individuals working separately have developed their own ideographic symbol systems that operate under specific rules of grammar.

Many symbol systems have grown out of research in speech rehabilitation. Charles K. Bliss, inventor of the Blissymbolics, calls his symbol system "semantography" (Bliss, 1965). The Blissymbolics have been used as early

as the 1970's as a communication system for speech disabled, prereading children. A drawback to Blissymbolics is that they are unintelligible to the untrained observer. They must appear with the English equivalents printed underneath for the untrained to understand the message coded in the system. Other examples of symbol systems in current use are rebuss systems, which combine two or more pictures with letters to communicate a concept (Clark, Davies, & Woodcock, 1974). The Yerkish Language makes use of designs called lexigrams which appear on different colored backgrounds to encode meaning. For example, a specific design appearing on a green background refers to a part of the body. This system was developed by von Glaserfeld for the Language Analogue Project at the Yerkes Regional Research Center (Rumbaugh, 1977). Premack, in his research investigating the linguistic potential of chimpanzees, designed a symbol system consisting of pieces of plastic, each representing a different word (Premack, 1972).

The disadvantages of these contrived systems for applied use is the necessity for specialized training. Investigation into the generality of symbol recognizability is a first step. This information will facilitate the development of symbol systems which make use of tendencies to recognize particular shapes and line orientations as having particular meanings.

The concept of prohibition is one of the earliest verbal concepts to develop in the process of language acquisition. It is defined by Bloom as "a category related to rejection in that it involves (the child's) opposition to something someone else is doing or intends to do. Prohibition carries the added information that the opposed act is forbidden by authority" (Bloom & Lahey, 1978, p. 189).

The purpose of this investigation is to study the visual aspects of prohibition in symbol communication. The hypothesis tested whether certain lines appearing with symbols in the background would cause an individual to see prohibition of the activity or object in the symbol background represented. The prediction was that certain line combinations would be more frequently associated with prohibition, regardless of the symbol with which they were paired. If the most effective line combination can be ascertained, a theory may evolve concerning the basis of the association of those lines with the concept of prohibition.

Method

Design

The design implemented to test the hypothesis made use of seven experimental conditions of prohibition. Diagonal lines (/, \, X) were chosen as three of the

experimental conditions because of their common use in the environment in communicating prohibition. Vertical (|), horizontal (–), perpendicular (+), and hexagon frame (⬡) lines were used as experimental conditions to investigate the effectiveness of lines not commonly associated with prohibition. These lines will be referred to as prohibition indicators. Symbol backgrounds were selected by the author to represent concepts that frequently need to be communicated in daily living. These concepts also could be communicated in a negated form and be meaningful. They were chosen on the basis of their simplicity and because they do not commonly appear in everyday life with the prohibition indicators. The seven symbols used as backgrounds were a) a running figure, b) a telephone, c) a foot stepping on the grass, d) a dog, e) an electric plug and cord, f) a truck, and g) a bicycle.

Seven forms of an inventory A-G were constructed, with the seven different experimental symbols appearing in each form. The experimental symbols occupied positions 18, 40, 60, 78, 105, 143, and 170 among 179 other symbols. Seven symbols included in the inventory were the same backgrounds used for the experimental conditions, but appeared with no prohibition indicators. These symbols were used to control for the recognizability of the backgrounds.

The order of the symbol backgrounds in each of the inventories was held constant. Different orders of prohibition indicators appeared over the backgrounds for the experimental symbols in each of the seven forms of the inventory. There was no provision made to test for order effects. Considering the large number of unrelated symbols in which the experimental symbols were embedded, it was assumed that the order effects of the symbol backgrounds would be negligible.

Subjects

The subjects were 105 undergraduates from a small southwestern university. They were volunteers from political science, history, and psychology classes that were willing to participate in psychological research. All subjects had English as their first language. The sample included students from 47 different majors which spanned the fields of the fine arts, the physical sciences, business, education, the social sciences, and the performing arts. Forty-four males and 61 females participated in the study. The data were collected by group administration. Fifteen of each inventory were distributed to form seven of the 49 possible combinations of prohibition and backgrounds.

Instruments

The symbol inventory was constructed partially from symbols used in daily life, such as traffic signs, signs in airports identifying public facilities, and labels used in international marketing. Some of the symbols which were created for the inventory represent verbal concepts not commonly symbolized. The Symbol Sourcebook by Dreyfuss (1972) was one of the principal references for common symbols. All of the replications and alterations of the symbols used in the inventory were drawn by Alexander Kunsak, a professional graphics designer.

Seven precautions were taken to control the variance between structural features of the inventory and the symbol designs. To avoid the possibility of the prohibition indicators communicating prohibition because of their prominence over the symbol, a fine point black marker was used to draw lines narrow in width. Only seven experimental symbols were used per inventory in order to prevent establishment of a prohibition set. This set would cause the subject to interpret every experimental condition as prohibition if a large number appeared together and created a tendency to generalize from one symbol to the next. The experimental symbols (see Appendix B) were scattered throughout the inventory so that they might be viewed in a neutral context.

The inventory was 215.9 x 279.4 millimeters in dimension (see Appendix B). It consisted of four pages, with 42 symbols appearing on the first page and 48 symbols appearing on each of the successive pages for a total of 186 symbols. Each symbol was 31.8 millimeters wide and 19.1 millimeters high. A space 6.4 millimeters high and 31.8 millimeters wide was provided below each symbol for the subject to write a response. The symbols were spaced with 1.6 millimeters separation on adjacent sides. Each symbol background was drawn in black india ink. The inventories were duplicated by xerox process.

Procedure

One of three experimenters randomly administered the forms of the inventory to the experimental groups. Each experimenter read a set of standard instructions (see Appendix A) to introduce the inventory. The inventory was identified as a survey of symbol recognition. A brief description of what would be required to participate in the study was asked to return his inventory unmarked. To prepare the subjects to approach the inventory with the proper mind set, three examples of symbols to identify were provided. Possible one to three word responses were given for those symbols. Time was provided for questions. Time allotted for completing the inventory was approximately 20 minutes.

Statistical Analysis

The frequency of prohibition responses to the experimental symbols constituted the dependent variable for hypothesis 1. The frequency of distortion in the symbol background constituted the dependent variable for hypothesis 2. Since the data consisted of frequencies, nonparametric statistics were used. The analyses performed were chi square tests.

Results

Judges Rating of Prohibitions

Three masters level students in clinical psychology with no knowledge of the research hypotheses were asked to sort a compilation of the subjects' responses to the experimental symbols into two categories: a) a verbal response indicating that the symbol was interpreted as meaning prohibition and b) a verbal response that communicated some concept other than prohibition. The judges were given the following definition of prohibition: the stopping or prevention of an activity or the presence of an object in a particular area. (For the training method used to educate the judges, refer to Appendix C.)

In some situations, the judges complained of difficulty in determining the meanings of the verbal responses in order to categorize them. They found the two or three words that constituted most of the responses

insufficient to clearly determine some of the categorization in a precise manner. They stated that they had to intuit what the meaning of the words were. In some cases they proceeded by repeating them to themselves and making a decision as to what the words seemed to "sound" like in some context in which the symbol might appear. Despite the semantic coding difficulties, the judges agreed on 89.1 percent of the responses. Disputed responses were determined by a third rater. The judges did not categorize as prohibition any of the verbal responses given to the stimulus representing the electric cord and the plug in any of the experimental conditions. That symbol was removed from the statistical analysis of prohibition.

Effects of Gender

It was necessary to insure that the analysis of the data would not be confused by gender differences. The frequency with which males and females made prohibition responses was tabulated. A difference between proportions test was performed to investigate the relationship between gender and frequency of prohibition response. No significant difference was found in the frequency with which males and females identified prohibition in the experimental symbols, $z = .35$, $p < .7$ in a two-tailed test. In further analysis, the genders were combined.

Statistical Analysis of the Prohibition Indicators

It was necessary to determine if any combinations of symbols and indicators were particularly successful or unsuccessful at communicating prohibition. A chi square combining the seven prohibition indicators and the seven symbol backgrounds was performed. No significant covariance was found between symbol backgrounds and prohibition indicators, $x^2(36) = 23$, $p < .7$.

The next step was to determine whether there was a significant difference in the frequency of prohibition responses as a function of the prohibition indicator used. A chi square comparing the seven prohibition indicators for frequency of prohibition and nonprohibition responses was performed. A significant difference was found, $x^2(16) = 22.45$, $p < .001$. Table 1 shows the frequency of prohibition responses for each indicator across the seven backgrounds. The indicators and backgrounds appear in Table 1 in order of effectiveness at expressing prohibitions. Tests of the difference between proportions in adjacent comparisons were performed to determine differences in effectiveness of prohibition indicators. No significant differences were discovered between X, / , and \ in their effectiveness at eliciting prohibition responses. However, a difference in the frequency of prohibition responses to \ (and, by implication, X and /) as opposed to + was

significant, $z = 3.00$, $p < .01$. These results support hypothesis one, as diagonal lines were more effective than the other symbols tested.

Judgment of Distortion

The definition used in the judgment of distortion was a verbal response which indicates that the subject conceptualized the background symbol differently in the control condition than in the experimental condition. The author reviewed the experimental and control symbols and tallied the frequency of distortions.

Some of the distortions which occurred reflected a subtle shift in concept. An example would be the control symbol of the dog responded to as "dog" in the control condition, but as "pet shop" when the prohibition indicator was superimposed on it. The control symbol of runner with / added became a pole vaulter to some subjects. Some distortions reflected a gross alteration of concept. One example of this was a foot stepping on grass in the control condition becoming a train running on railroad tracks in the experimental condition. All distortions were tallied as being equal, with no attempt being made to establish special categorizations.

Statistical Analysis of the Distortions

In order to determine whether there was a relationship between prohibition indicator used and presence of

Table 1

Percentages of Prohibition Responses by College Students to Background Symbols Combined with Prohibition Indicators

Prohibition Indicators	Background Symbols - Each N = 15							Mean % Prohibited N = 105
	Truck	Dog	Bike	Foot	Runner	Phone	Plug	
X	80%	60%	67%	60%	60%	20%	0%	50%
/	60	73	80	20	33	7	0	39
⬡	73	47	53	40	13	7	0	33
+	27	33	20	27	0	0	0	15
|	13	20	7	13	0	0	0	8
–	20	20	0	7	0	0	0	6
\	13	0	7	7	13	0	0	5

Note: Statistical analysis of differences between proportions obtained the following:

X = / = \ (no significant difference)

X = / = \ ≠ + ($p < .001$)

+ = | = – = ⬡ (no significant difference)

distortion of the symbol background, the frequency of symbol distortion was tabulated. A chi square was performed to test the relationship. The results showed no difference in distortion effect across prohibition indicators, $x^2(6) = 3.83$, $p < .7$. The secondary hypothesis of the study, which stated that there would be a difference across indicators in distortion, was not supported by the results of the analysis.

The data seemed to indicate a difference between backgrounds in frequency of distortion. A chi square comparing symbol backgrounds to frequency of distortion was performed to investigate if this difference was significant. The results were that a relationship between symbol background used and the presence of distortion was significant, $x^2(6) = 22.46$, $p < .001$. Tests of differences between proportions were performed in adjacent comparisons. As seen in Table 2, the runner and the foot were similar in the frequency of their distortion. The foot, however, was distorted more frequency than the plug, the truck, the dog, the phone, and the bike, $z = 4.33$, $p < .001$. The plug, truck, and dog were not significantly different in their tendency to be distorted. However, the dog was more frequently distorted than the phone or bike, $z = 2.2$, $p < .01$.

Table 2

Percentages of Distortions in Concept Occurring in College Students' Responses to Control and Experimental Symbols

Prohibition Indicators	Background Symbols - N = 15							Mean % Prohibited N = 105
	Runner	Foot	Plug	Truck	Dog	Phone	Bike	
—	67%	67%	40%	13%	13%	13%	13%	32
+	73	53	13	20	33	7	7	29
⬡	40	40	40	53	27	0	0	28
/	53	53	13	33	20	7	7	26
\	86	60	27	0	7	0	0	26
|	47	27	33	47	0	20	7	26
X	47	47	0	7	20	0	7	15
Average % Symbols	59	50	24	23	17	7	6	

Discussion

The primary hypothesis of the study was that a difference in effectiveness exists between prohibition indicators. The results of the study support this hypothesis. Indicators that made use of diagonal lines were best at communicating prohibition of those compared.

The secondary hypothesis of the study was that prohibition indicators would differ in distortion of the meaning of background symbols. The results of this study do not support the hypothesis. Each prohibition indicator seemed to cause a similar amount of distortion in the symbol backgrounds. Symbol backgrounds differed in the frequency of their distortion, but the effect of the indicators in the distortion was insignificant.

It is apparent that symbol backgrounds and indicators can be separated for analysis into constituent parts. The potential for using this type of design methodology in research in symbol communication was established.

One primary finding was that indicators differ in their effectiveness to communicate prohibition. No prohibition indicator appears to be effective in communicating prohibition every time it appears. Even the best indicator of prohibition, X, was found to be effective only 50% of the time when out of context. Further study into the effectiveness of indicators might include

decreasing the ambiguity of conditions under which symbols are identified by providing some context for communication to occur. Requiring someone to identify symbols out of context is a task comparable to defining a word on the vocabulary subtest of the WAIS-R. Such a task might be considered more of an intelligence test than a simple perceptual task.

The question of why, despite an ambiguous context, a prohibition indicator that makes use of diagonal lines elicits more prohibition than other indicators remains to be considered. One possible explanation is a physiological mechanism in perception that is at work when diagonal lines are seen that associates them with the concept of prohibition. The concept of prohibition associated with diagonal lines would, in this case, be considered related to an innate process. A physiological event that takes place in the visual cortex when an individual sees diagonal lines was identified by Hubel and Wiesel as a feature detector process. Lines are represented by sensory transduction in the form of chains of simple cells firing. The lines are represented and processed through chains of successively more complex cells until the image is stored as a memory (Hubel and Wiesel, 1963). A slanted line across a background is more easily differentiated from that background and identified as a

new concept because of the particular sensitivity of the feature detector system to lines approximately 45 degrees from the perpendicular.

A second explanation is that the association of diagonal lines with prohibition is a learned tendency only, based on frequent cultural exposure to the phenomena. Perhaps the slanted line and the X are learned as meaning prohibition through the exposure of most adult individuals to traffic symbols, airport signs, and labels on toxic chemicals. The association between lines in this orientation and prohibition may be generalizable to the symbols that appear out of context in some format like that of an inventory. However, the convention of using such lines had to have utility originally to be used in so wide a variety of symbolic contexts at the present time. It is likely that the sensitivity of the feature detectors in the cortex are instrumental in forming the association with the concept of prohibition.

The process of the identification of prohibition may be a function of both variables, an interaction of innate and learned tendencies. The sensitivity to diagonal lines paired with a learning history of having seen diagonal lines may communicate prohibition in the environment. Traffic and airport signs and poison labels, for example, may account

for prohibition being identified with diagonal lines in symbols without an associational history of prohibition or appearing out of specific context. Further study of the concept formation of verbal prohibition in young children may increase the understanding of the same concept in symbol communication.

The second major finding of this study is that there is no significant difference in the frequency of the distortion of backgrounds through the introduction of a prohibition indicator. The quality of the background figure itself seemed to determine whether it was distorted in meaning from the experimental condition to the control. There was a small incidence, though not significant statistically, of the indicator affecting the meaning of the background symbol. In these cases, the tendency appears to be that an individual usually will interpret an added element in a symbol in a way that contributes to the meaning of the symbol background. The individual may not be certain as to the accuracy of that identification, but the tendency that appears to be present in the perceptual process is to integrate the new feature.

It is safe to assume that out of context the integration process must relate to thematic complexity, a variable that the individual brings to the stimulus situation. A lifeguard at a swimming pool may view a running figure with a diagonal line across it and translate "don't run" because

he deals with preventing accidents around an environment that is often slippery and hazardous. A track and field varsity letterman or woman might see the same figure as a pole vaulter because each has interpreted the prohibition indicator as a piece of athletic equipment. If there is no context in which the symbols are to be interpreted, the individual interpreting the symbol is likely to create a context. The origin of that context is the perceiver's learning history which provides associations which are personal and sometimes unique.

This study found that diagonal line prohibition indicators are less often associated with distortions of the symbol backgrounds than the other prohibition indicators. The indicators may be elements so distinct from the background symbol that they command attention to themselves as separate entities. That is, they may exist as separate communicative concepts that have the ability to appear with the symbol concept without being absorbed by it. An example would be: Dog + X = "No pets allowed". Both elements have maintained their original identity, but in combination produce a change in communicative concept. If this is the process that takes place, the discovery of more symbolic elements that affect the meaning of symbol backgrounds in a similar way may lay the foundation for a symbol grammar that does not rely wholly on a contrived system; one that does not need to be learned.

A chance discovery from this research pinpoints a problem inherent in doing an investigation which requires translation of concepts. A nonverbal concept may be translated into more than one verbal concept. An example of this is an electric cord and plug being paired with a prohibition indicator. The process of determining the semantic message of the symbol depended upon whether the symbol communicated one of two types of negation: prohibition or nonexistence. That is, either "Do not use the electricity" or "There is no electricity available for use."

In Blooms' research among English speaking children (Bloom & Lahey, 1978), she discovered that the concepts of nonexistence, rejection, and denial appeared in children's speech in that developmental order. Prohibition develops later as a concept. The two meanings prohibition and nonexistence, differ developmentally in their appearance. They also differ semantically, with nonexistence signifying the absence of disappearance of an object and prohibition dealing with prevention, as illustrated above. However, perhaps it is impossible to make such fine differentiations in meaning in pictorial modes. Referring to the electric plug example, responses such as "no electric," "no electricity" and "no plug-ins" might come from the same symbol as responses such as "don't plug appliances in here." The possibility of one symbol meaning two different types of negation, the choice depending on environmental context, raises additional

questions. There may not be a specific, one-to-one correspondence between symbolic meaning and semantic meaning. The symbol may be a more economical unit than the verbal message. As a result, what is seen may be sometimes difficult to accurately put into words.

In future research on prohibition, it is reasonable to suggest that the use of easily identifiable symbols will produce higher consensual validity. Symbols that are constructed in this manner tend to maintain their meaning and are less frequently distorted. Although more than one meaning may be attached to a symbol, research with symbols in a specific environmental context may reduce error.

Appendix A

This is a survey of symbol recognition. You will be asked to look at each symbol and identify it by writing a few words in the blank space below it. If you would like to participate in this study, the following instructions will be important to you. If you would prefer not to participate, please turn in your blank inventory to the researcher. Make no marks on the inventory if you do not intend to complete it.

In the left hand corner of the first page there is a space for you to print your major, native language, and please include your age. Circle your sex, M or F. Please do this now.

Now, look at the samples marked A, B, and C below the lines you have just completed. Look at each symbol individually and in order - moving left to right. Write your immediate impression of what the symbol intends to communicate. Write or print clearly and legibly. Do this now.

Possible answers to A are: 1) and intersection, 2) Red Cross, 3) Safety, 4) Christian.

Possible answers to B are: 1) Cigarette, 2) Smoking, 3) Cigarettes sold here, 4) Smoking allowed here.

Possible answers to C could be: 1) Tepee, 2) Campground, 3) Beaker.

As you can see, any of a variety of answers are acceptable...

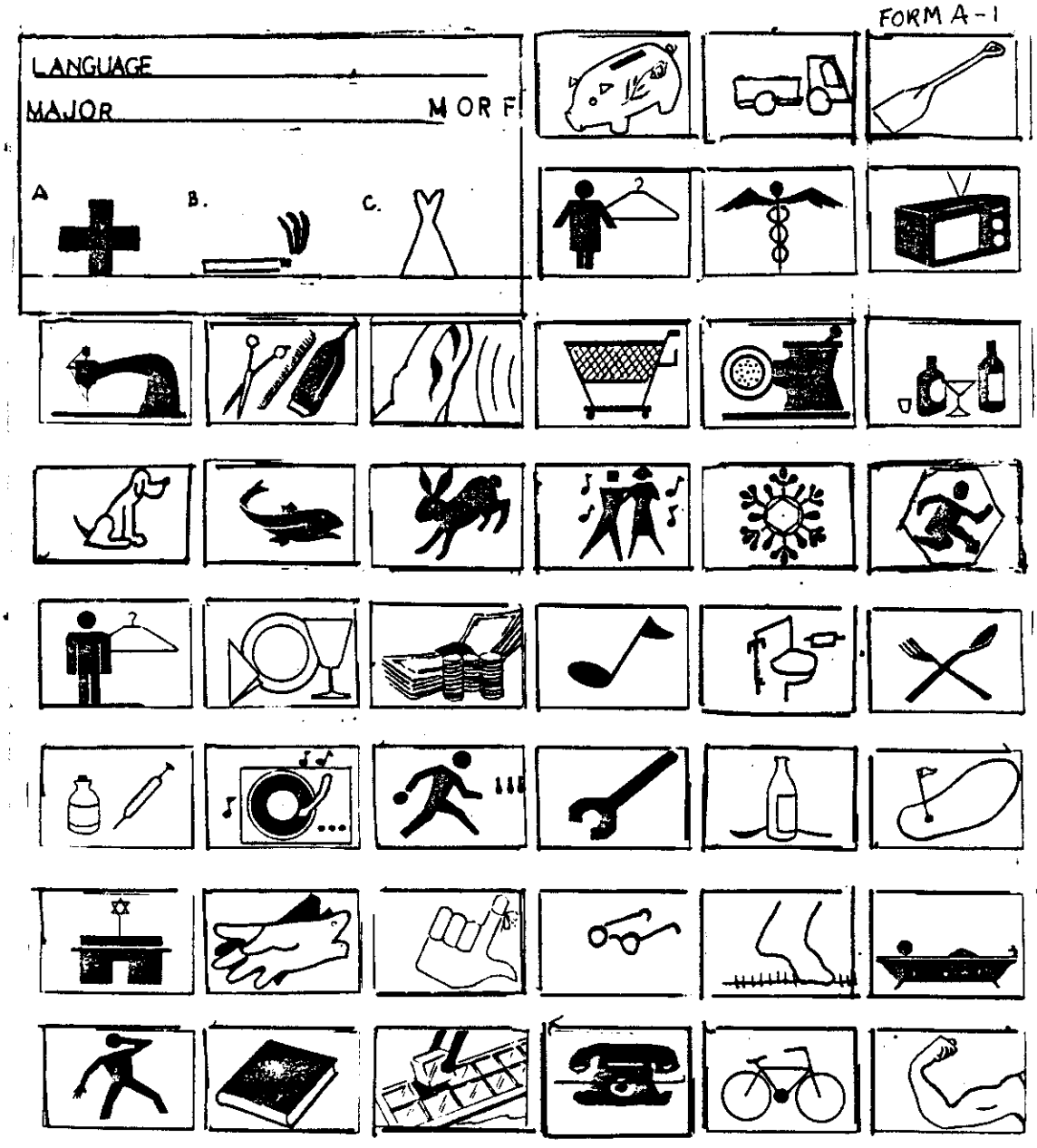
Make an attempt to identify each symbol. Do them in order, starting with the symbol located at the top of the page nearest the left hand corner and moving to the right. Do not skip any, don't go back and change any. Do them as quickly as possible. Remember that you have four pages and approximately 20 minutes.

If you are interested in the results of this study, write your name and address on the back of the inventory (the last page) and you will receive information concerning the results in the mail after the research has been accepted by a publisher. Do this after you have completed the inventory.

After you are finished, return the inventory to the researcher.

Thanks.

Appendix B



(Sample Page 1 of 4)
Reduced 30%

Appendix C-1

Please read the following directions very carefully:

You are being asked to rate the written interpretations made by subjects to pictures. Some of these pictures bore a close resemblance to signs in public places that communicate important information. As a context for each response, imagine that response appearing on a sign with the intent of communicating information to the public. Some signs communicate prohibition, some direction, some description, etc. Focus your attention on the aspect of prohibition and rate each response on how it conforms to the definition of prohibition as it is provided on the next page. You may want to detach this page and use it along side the scoring sheet for convenient comparison. Read the next page and then proceed to the practice responses.

Appendix C-2

Prohibition - the stopping or prevention of: a) an activity or b) the presence of an object or person in a particular area.

1) A prohibition can be a direct command, such as "Stop the music" or "Don't drink the water". Others are "Keep out", "Do not enter".

2) A description can also communicate prohibition, such as "Visitors prohibited" or "Smoking forbidden in this area".

Not prohibition - 1) Prohibition by inference, such as "Keep windows closed", "Pass on right only".

2) Warnings, such as "Beware of falling rocks" or "Dangerous curve ahead".

3) Non-prohibitory description, such as "No vacancy" or "No shoulders".

Rate each prohibition response 1. Rate each response that does not indicate prohibition 2. Proceed to the practice exercises.

Appendix C-3

Practice responses:

___ A. No fishing here.

___ B. Don't feed the bears.

___ C. Watch for children

___ D. No alcoholic beverages.

___ E. Danger: electric fence.

___ F. Keep arms inside cars.

___ G. No passing.

___ H. No facilities at this rest stop.

Check your answers:

Responses rated 1 are: A, B, D, G. All others are rated 2, for non-prohibition or "other".

If you have made scoring errors, stop and reread the preceding instructions. Do not proceed to the scoring task until you understand the scoring criterion and have mastered it.

Do not compare your answers with those of the other judges. Proceed to the next page.

Appendix C-4

1 - prohibition 2 - Other (Sample page, 1 of 4)

___	No pedestrian crossing	___	Jumper/runner
___	Do not run	___	Bow
___	No crossing	___	Dancing
___	A jogger	___	Run
___	Jogging allowed	___	Dance
___	Person running	___	Athlete
___	Running trail	___	Stoop
___	Bad dude	___	Criminal
___	Track running	___	Sniper
___	Dead man	___	Sports
___	Jogging sign	___	Running
___	Pedestrian crossing	___	Relay
___	No robbers	___	Runner
___	Dead men	___	Robbery
___	Man running	___	Jogger
___	Somebody running	___	Athletics
___	No running	___	Discuss
___	Danger spot	___	Shadow
___	No horseplay	___	Agony
___	Art object	___	Unknown
___	Accident victim	___	Exercise
___	No crossing	___	Slippery
___	Move quickly	___	Falling

Appendix C-4--Continued

___ Pole vaulting

___ Pole vaulter

___ Cross country

___ Sports Center

___ Kids crossing

___ Athletic

___ Incline

___ Fighting

___ Lost

___ Jogging

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