important question. With the partial exception of Telidon, and the Ontario initiative in microcomputers, it appears that forces external to Canada and certainly external to each provincial ministry of education are driving us before we have developed adequate policy initiatives or responses.

The question of Canadian content becomes increasing critical and the urgent need for inter-provincial co-operation in the production of software is more evident day-by-day.

Moreover, there are sound pedagogical reasons why front-line educators across Canada should be involved now in policy development, specification of standards and design of hardware rather than leaving the field to the business and industrial marketplace.

"The question of Canadian content becomes increasingly critical and the urgent need for inter-provincial co-operation in the production of software is more evident day-by-day."

The Canadian Studies Office of the Association of Canadian Community Colleges is not the panacea to the problems outlined. What single organization could be?

With a budget of $325,000 per year, we have attempted to serve Canada's 170 colleges and technical institutes. With a budget of less than $1.00 per student per year it is obvious that we can never hope to be much more than a catalyst. However, in a country where the constitutional responsibility for curriculum development lies clearly with the provinces, the role of catalyst is appropriate for a national educational organization.

If the situation is to be altered, the provinces, and the colleges, institutes and individual administrators and faculty in each province must accept the responsibility for both minor and major changes in attitude and curriculum.

The following constitute some areas of potential activity within each province:

1. Statements of support for increased Canadian content.
2. Curriculum changes: a) addition of inter-disciplinary Canadian studies courses; b) modules on Canadian politics, economics, etc. oriented to the particular trade or career program; c) development of labour studies courses and modules.
3. Funding for the development of learning materials which draw on the Canadian experience.
4. Release time to faculty for the development of traditional learning materials and software for microcomputers, videodiscs and Telidon.
5. Facilitation and encouragement of exchanges of faculty and administrators between provinces.
6. Encourage faculty to cite Canadian examples whenever possible.
7. Discourage the apparent inherent — perhaps genetic propensity of Canadians for self-depreciation. Parenthetically, it must be noted that the CBC even uses medical terminology as the title of our one national open-line radio show — Cross-Country Checkup — as though we are sick.

It should be noted that the provinces have a particular responsibility to ensure a minimum of duplication of effort in the production of both traditional learning materials and software for the new communications technologies. Any other course of action in the world's second largest nation with a sparse, unevenly distributed population would be economic folly. In this vein, the provinces **must** create and ensure the maintenance of excellent mechanisms for the inter-provincial exchange of all types of learning materials. Inter-provincial compatability of micro-computers, videodiscs, and Telidon systems is an absolute necessity if the exchange of software is to be enhanced. The provinces, probably through the Council of Ministers of Education, must therefore, make common, or at least, compatible hardware acquisition decisions.

Up to now, I have concentrated on painting with a broad brush some of the problems which the Association of Canadian Community Colleges has identified with relation to Canadian Studies. In the process the purpose of the Canadian Studies Office has hopefully been identified.

"...the provinces must create and ensure the maintenance of excellent mechanisms for the inter-provincial exchange of all types of learning materials."

I have touched briefly on the question of the potential of the Canadian Studies Office by describing our work as that of a catalyst.

In some provinces, we have had a greater impact than in others. This situation is likely to remain for some time although our higher rates of success will likely shift to other provinces.

In attempting to draw together — Canadian studies and content on one hand and new communications technologies on the other, let me point once again to the technical advances which television made in its first 25-30 years of commercial use. If you examine those changes closely you will discover an exponential rate of technical change in the last eight-ten years. Given the pervasiveness of television today and its cultural and social effects we would have to be blind to ignore the potential impact of microcomputers, videodiscs, Telidon and satellite broadcast TV on Canada's political, economic and cultural sovereignty.

Children's Perception, Retention and Preference of Asymmetical Composition in Pictures

Nikos Metallinos

The ability of children to understand and enjoy dynamic structures in visual images has often been underrated. Depending upon their age and development, elementary school children have a greater level of comprehension of visual display (due primarily to their constant exposure to television) than we realize. Just because their responses are not in accordance with the established pictorial codes and compositional guidelines drawn by adults, does not mean that children cannot appreciate and learn from a dynamic and more complex composition. We often simplify the visual images used for class instruction to such an extent that children loose interest and the learning task is jeopardized. This over-simplification in developing visual aids for instructional purposes (drawings, photographs, slides, TV and film programs, etc.) has delayed the development of visual literacy in children. I suspect that the rules of picture composition that underline the aesthetic function of pictorial media apply equally when constructing visual messages for elementary school children. Furthermore, I am in total agreement with the advocates of hemispheric lateralization who suggest construction of visual images on the bases of the asymmetrical functions of the human brain (Ragan, 1977, p. 3).

Nikos Metallinos is an Associate Professor of communication studies at Corcordia University.

Statement of Problem

There are extensive empirical investigations on the dynamics of speech delivery, speakers' credibility, persuasion techniques, etc. (McCrosky, et al, 1971). There are also studies dealing with pictorial factors in visual education (Cochran, 1980, Levie, 1978). However, studies concerning the dynamic structure of the visual image in instructional materials in education, such as asymmetrical placement of visual elements within the visual field, balance, framing, spacing, image size, form, color, etc., are scarce (Metallinos, 1980). Studies on the importance of the distinct functions of the human brain (in processing visual cues) have only just begun to emerge (Anderson, et al, 1981).

In their study on the effects of the left vs. right placement of visual images in regular newscasts, Metallinos and Tiemens (1977) suggest that color, shape or form, size and directional lines (vectors) of pictorial cues are contributing factors affecting viewer perception, recognition and retention of visual images. The recognition of these pictorial cues as factors affecting the total composition of a visual display by elementary school children depends on two factors: 1. their level of cognitive development, and 2. the visual codes or production elements which are used in the visual message (Acker and Tiemens, 1981). The perceptual and cognitive skills of children in elementary school (aged 9-11) are well developed, at lease insofar as image size, color and shape or form are concerned (Piaget, 1974).

This study examines how children are influenced by idiosyncratic shapes, distinct colors, and dynamic composition or asymmetric placement within the confines of a still photograph. In other words, placement of visual elements within the left or right side of the visual field will differentually affect children's perception, retention and preference. Furthermore, such distinctions are attributed to the particular shapes, colors and total synthesis of the visual displays.

"...the rules of picture composition that underline the aesthetic function of pictorial media apply equally when constructing visual messages for elementary school children."

Previous Studies

Psychological studies on the perception of visual images (Heber, 1968) and neurological studies on the distinct functions of the left and right hemispheres of the human brain (Ornstein, 1973) have contributed greatly towards our understanding of the composition of images. Scientific evidences provided by such psychological and neurophysiological studies, have shown that viewers' discriminate in their preferences of place-

ment of visual materials within the visual field. Trotter's (1976, pp. 218-223) study on the hemispheric specialization of the human brain points out the unique functions of each hemisphere. Ragan's (1977, p. 10) argument for a taxonomy of right-brain visual literacy outcomes is very important because the pictorial factors of shape, size, color of visuals, etc., are considered serious hemispheric lateralization research variables. Herbener's et al (1979) investigation of the precise placement of visual elements within the frame, and Niekamp's (1981) study of the factors affecting visual balance have produced inconclusive results. However, both are key studies in the development of visual literacy. Further investigation in this area is warranted.

Psychologists have observed how viewers perceive and recognize shapes, forms or patterns, starting with simple geometric figures (such as rectangles, circles, triangles, squares, etc.) and progress to more advanced, complex and ambiguous ones such as multisided figures, three-dimensional objects, reversible figures, etc. (Murch, 1973, pp. 122-149). Depending on such key factors as duration of presentation, the development of the perceiving individual and the individual's familiarity with the pattern (shape or form), the order of preference and recognition is triangle, circle, square, parallelogram, rectangle, etc. (Murch, 1973, p. 123). This empirical evidence has been observed and stated by Taylor (1964, p. 19), a renowned analyst of the visual arts, and Hochberg (1978, pp. 131-149), a perceptual psychologist, who both maintain that the simpler and more stable the pattern, the more readily it is perceived and recognized. This implies that the extent to which a viewer perceives, retains and accepts the total synthesis of visuals within the field depends on the degree of simplicity of the particular visual.

The concern of this study, however, is whether or not similar patterns (shapes or forms) are perceived and/or recognized more readily when they are placed on the left-visual field rather than the right, as long as the rest of the visuals within the frame remain constant. Trotter's (1976, p. 219) list of hemispheric specialization, and Ragan's (1977, p. 10) taxonomy of right-brain visual stimuli suggest that the perception of abstract patterns and recognition of complex figures (both of which are functions of the right hemisphere of the brain), are left field specializations. Can we infer, however, that such specialization and preference could be said for the left visual field of still pictures? This hypothesis needs to be tested.

"This study examines how children are influenced by idiosyncratic shapes, distinct colors, and dynamic composition or asymmetric placement within the confines of a still photograph."

Empirical studies on viewer perception, retention and total synthesis of colored images are also extensive (Birren, 1961 and 1962, and Hurvich and Jameson, 1966). Closely related to this investigation is Alexander and Shansky's (1976) experimental study on the influence of the three-color attributes (hue, saturation and brightness) on viewer perception of the weight of colors. According to these authors (Alexander and Shansky, 1976, p. 72):

In addition to its information content, color is known to have certain affective qualities. We have investigated the assertion that colors have different apparent weights using a magnitude estimation technique. We find that the apparent heaviness of colors is an increasing function of chroma or saturation and a decreasing function of value or lightness. Hue has little influence on the apparent weight of color.

The "darkness" and "lightness" of colors have been found to be contributing factors in viewer perception of hues (Pinkerton and Humphrey, 1974). Thus, blues appear to be lighter than yellows and yellows are lighter than reds. Is the apparent weight of color at all correlated with its preferred placement within the left and right visual field? An interesting observation has been made by Arnheim (1969, p. 323) who concludes that:

Since shape and color can be distinguished from each other, they can be also compared. Both fulfill the two most characteristic functions of vision. They convey expression, and they allow us to obtain information through the identification of objects and happenings.

Abstract

This study examines the asymmetry of the field theory insofar as young viewers' perception, retention and preference for still visual images are concerned. The purpose of this experimental investigation is to determine whether or not the specific shapes, colors and placement of visuals within the picture frame effect the abilities of young viewers (aged 9-11) to perceive, describe and retain them, and whether or not such an asymmetrical composition is preferred.

It was found that 1. the children's ability to perceive and readily describe certain visuals within the left or right side of the visual field is greatly dependent on the shapes and colors of such visuals; 2. the retention and recall of such visuals is more accurate when such visuals are unique in their shapes, outstanding in their colors, and probably when placed within the left visual field; and 3. the children's preference for the total compositional structure of still images is affected by the asymmetrical placement of the visual elements on the left-hand side of the visual field rather than the right.

"The concern of this study, however, is whether or not similar patterns (shapes or forms) are perceived and/or recognized more readily when they are placed on the left-visual field rather than the right..."

This relationship is also observed by Bloomer (1976, p. 109) who states that:

Context is the most influential frame of reference for color perception. A single swatch of color will seem brighter, duller, darker, or changed in hue by changing only the context in which the color is seen.

In evaluating the empirical findings on the subject of color preference, Arnheim (1969, p. 334) concludes that color preferences are related to complex social and highly personal factors, which observe the experimentation and bias the results. He suggests that "...it might be preferable not to experiment with colors 'as such', but to relate them to specific objects as is done in the field of market research" (Arnheim, 1964, p. 334). The perception of colors, their retention, and their preference, have not been reliably determined. Consequently, viewer perception, retention and preference for colors due to their placement within the visual field requires further testing. Numerous experiments conducted by such interested groups as physicists, paint manufacturers, artists, interior decorators, neurologists and, of course, psychologists, have been done (Kling and Rigs, 1971, pp. 395-474), and these seemingly superfluous attempts by researchers have been summarized by Boynton (1971, p. 315) as follows:

Unfortunately, data from many studies, where global judgements of color preference have been obtained, seem meaningless. In the first place, because color is perceptually attached to objects we do not necessarily have a favorite color that transcends all circumstances; red may be fine for fire engines, but not for the living room wall. Second, colors typically exist in more than one part of visual space at a time. The appearance of a color depends upon its surroundings and so do color preferences.

Important differences in viewer perception, retention and preference of colors due to their left or right placement within the visual field were expected, and a hypothesis and a treatment testing such probable differences was deemed necessary in this study.

Comparing the effects of 1. full-background still visuals on the TV screen, versus no background visuals at all, and 2. corner screen location of visuals (opposite a live newscaster), as opposed to no visuals at all, Coldevin's studies (1978, pp. 17-18 and 1978, pp. 158-159) on television newscast strategy and Baggaley and Duck's (1974, pp. 1-4) studies on the effects of adding background, have revealed some very important conclusions focusing on the variables involving the present investigation. According to Coldevin (1978, p. 159), "When location establishment static visuals are used to enhance a speaker's delivery (when he is positioned centrally), a full screen is more effective background display strategy." Furthermore, these studies suggest that "when symbolic presentations are used to enhance a news reader's delivery, a corner screen location is the more compelling background display strategy" (Coldevin, 1978, p. 159). These studies did not, however, concern themselves with the asymmetrical placement of such still visuals and their preferred placement (left or right) within the visual field which is a major concern of this study.

"The 'darkness' and 'lightness' of colors have been found to be contributing factors in viewer perception of hues..."

Hypotheses

Although the review of literature suggests that the left visual field is more appropriate for the presentation of visual information, there is a disagreement among constructors of visual messages regarding the asymmetry of the visual field.

The following hypotheses were used to test the effects of placement within the visual field of still TV pictures on viewer perception:

1. Placement of visual elements on the right or left side of the visual field (still TV pictures) does not significantly affect children's ability to perceive and to readily describe their shapes (forms or patterns).
2. Placement of visual elements on the right or left side of the visual field (still TV pictures) does not significantly affect children's ability to perceive and to readily describe their color.
3. Placement of visual elements on the right or left side of the visual field (still TV pictures) does not significantly affect the retention of visual content.
4. Placement of visual elements on the right or left side of the visual field (still TV pictures) does not significantly affect children's preference of their general composition.

Experimental Materials

The stimulus materials utilized to test the four null-hypotheses were 20 slides made from an original videotape containing news stories. The ten slides which were used to test Hypothesis #1 (shapes of visuals), Hypothesis #2 (color of visuals) and Hypothesis #4 (preference of total synthesis of visuals) captured the newscaster in a medium close-up facing the camera. The newscaster's image occupied either the left or right side of the visual field. The other side of the slide, opposite the newscaster, was proportionally balanced with the placement of a specially designed visual to illustrate the content of the news story. The illustrations were 10 different visuals, simple pictures, faces, drawings, objects, that formed several geometric figures such as circles, rectangles, triangles, etc., alternately placed on the left and right side of the visual field. The subjects were briefly instructed as to the content of each slide, i.e. slide #1 "the population explosion," slide #2 "world wide inflation," slide #3 "world peace," slide #4 "the energy crises," slide #5 "American political parties," slide #6 "over taxation," slide #7 "the energy crises in Utah," slide #8 "the rising cost of living," slide #9 "public transportation costs," and slide #10 "world wide polution problems." Variables such as duration of visual exposure, viewing distance, etc., which could have distracted the children were kept constant.

The stimulus materials (test items) used to test Hypotheses #3 (viewer retention of the visual stimuli) consisted of 10 slides. Each slide contained five visuals, the visual originally used to symbolize the content of

the news story shown in the other tests, and four additional ones which were similar to the original. They depicted the same story or concept and were randomly presented.

Subjects and Procedures

Four tests were prepared and administered to a total of 48 elementary school children (aged 9-11) from a normal suburban elementary school in Montreal. Tests were administered successively to groups of 12 subjects at a time in one single session which lasted 20 minutes. An ordinary classroom was prepared to meet the prerequisites in projection, viewing distance, angle of observation, image size, timing of visual display, etc. (Wilkinson, 1970 and Mayer, 1973).

The test for Hypothesis #1 (perception of predominate/outstanding shapes and forms) was multiple choice. It consisted of 10 items constructed from responses gathered through pre-testing of the shapes, forms, or patterns contained in the visuals of the 10 slides. The image of the newscaster remained constant. Each slide was projected for 10 seconds with an interval of 15 seconds blank light to allow the subjects to mark their choices. The subjects were informed that they would see 10 slides with a picture of a person (newscaster) with a drawing beside him. They were asked to mark the shape in the drawing that they thought was visually the most important, regardless of content.

"The perception of colors, their retention, and their preference have not been reliably determined."

The test for Hypothesis #2 (viewer perception of predominant/outstanding colors) was also multiple choice, consisting of a total of nine possible items constructed from responses gathered by pre-testing of all possible colors contained in the visuals of the 10 slides. The pre-test was done by showing the slides to a group of college students and asking them to define the predominant or outstanding color(s) of each slide. The nine item test was constructed based on the results of this test. The colors of the background and the image of the newscaster were excluded. Since the same visual stimuli were used for the two tests (Hypothesis #1 and Hypothesis #2), the subjects were instructed to choose the predominant colors immediately after marking the predominant shape. Thus, the duration of the visual display remained constant, and first impressions were maintained.

The test for Hypothesis #3 (viewer retention of visual stimuli) provided five choices in each slide, one of which was the correct one. Each slide was randomly shown on the screen for ten seconds with a 15 second interval of blank light during which the subjects marked their choices on a five item choice test.

The test for Hypothesis #4 (viewer general preference for the total composition of the original 10 slides) consisted of a five-step preference scale ranging from "don't like at all" to "like very much." The testing procedure used previously was also applied here.

Analysis

A **t** ratio for related measures (Bruning and Kintz, 1964, pp. 12-15) was used to test for significant difference between viewer perception, retention and preference of visuals placed on the right side of the visual field and those placed on the left. The degrees of freedom (df) were 47, and the level of confidence for rejecting the null-hypotheses was set at .01.

Results and Discussion

The **t** (47) ratio result of 4.51 obtained from the first test was significant beyond the .01 level of confidence. Consequently, the hypothesis that the childrens' ability to readily perceive shapes (forms or patterns) is influenced by their particular position within the visual field, supported the theory of asymmetry of the visual field. Table 1 shows the survey of the scores obtained from each test, while Table 2 shows the total scores for each slide placed on the left and right side within the visual field.

A closer look at the results of this test, as shown in Table 2, raises the following points. First, the childrens' ability to perceive the visual content of a picture seems to be closely related to and dependent on the asymmetrical placement (left or right) of the visual regardless of the specific shape of the visual. This is explained by the uneven distribution of the total scores of left or right, although the visuals were consistently alternated within the visual field. Second, the simpler the visual display, the more readily it was perceived and recorded by the subjects. Circles were more readily perceived than rectangles (see test items #1 and #10), etc. Third, the degree to which visual stimuli are perceived and recognized greatly depends, perhaps, on the viewers' previous exposure and knowledge of such visuals, as demonstrated with the high scores of tests #1, #5, and #10.

"The stimulus materials... were 20 slides made from an original videotape containing news stories."

The **t** (47) ratio result of 2.24 obtained from the second test was not significant. Consequently, whether or not children are able to perceive certain colors more readily and distinctively due to their placement (right or left) within the visual field, is yet to be determined. Table 1 shows the survey of scores obtained from the second test. One can attribute the results of this test to any of the following factors. First, the background color of the slides (which were made from a TV newscast) was predominantly blue. Blue, as a base color, might have had a direct influence on the viewers' ability to differentiate the various foreground colors of the slides. Second, one or two clearly distinctive colors such as yellow and green, rather than a mixture of hazy and unclear colors, such as brown and orange, were more readily perceived by the children as the high scores of test items #5, #7 and #9 in Table 2 illustrate. Third, the unknown content of the visual display probably has a direct effect on the viewers' ability to accurately perceive the exact colors as test items #2 and #8 illustrate.

The **t** (47) ratio result of 11.13 obtained from the third test was significant beyond the .01 level of confidence. It supported the hypothesis that children aged 9-11 are able to retain the visuals that are placed on the left side of the picture more readily than those placed on the right. Table 1 shows the summary of scores obtained from the third test.

Retention and recall, however, of visual stimuli are complex processes, and, for the most part, hidden. Most of our recall and retention are due to some mechanism of the unconscious of which viewers are not always aware and responsible (Shevrin, 1980, p. 11). The more complicated the visual display, the more complex is the process of its retention. The results of this test raise the following points. First, regardless of left or right placement within the visual field, those shapes and forms which are peculiar, unusual, and dynamic seem to be more readily recalled and recognized as the high scores of test items #2, #3, and #5 illustrate. Second, not only the shapes, but also the colors of the above items were more dynamic, which might be the reason for their high scores. Third, the overall high scores in all items of the retention test (see Table 2) illustrate that the change of the context in which the visuals reappeared had very little bearing on the childrens' ability to identify them.

The **t** (47) ratio result of 10.87 obtained from the fourth test was also significant beyond the .01 level of confidence. It supports the notion that children aged 9-11 prefer an asymmetrical visual display. But no statement can be made as to which side of the visual field is preferred, although the data in Table 2 shows that visuals placed on the left (L) scored considerably higher than those placed on the right (R). It is probable that other factors such as clarity of visuals, previous knowledge, etc., affected the viewers' preference. Further investigation on this matter is warranted.

Conclusions

The arguments presented in this study regarding childrens' perception, retention and preference of asymmetrical composition in pictures can be summarized as follows:

1. Childrens' perception of certain shapes, forms or patterns of visual stimuli is affected by their asymmetrical placement within the left or right side of the visual field, along with the degree of the visuals' clarity and simplicity. However, since this study did not use a control group, it cannot be determined which side is preferred.
2. Childrens' perception of certain colors of visual stimuli does not seem to be determined by their asymmetrical placement within the left or right side of the visual field. Further studies on this issue are needed.
3. Viewers' ability to retain the shapes and colors of visual stimuli could be attributed to their outstanding shapes or colors as well as to their placement within the field. Further studies are needed to determine such asymmetrical preference.
4. Childrens' preference for the total compositional structure of still images is positively affected by the asymmetrical placement of visual elements on the left or right side of the visual field. However, this study can not determine the confidence which side of the visual field is preferred most by the young viewers.

"...the childrens' ability to readily perceive shapes (forms or patterns) is influenced by their particular position within the visual field..."

There are some limitations to this study that warrant further investigation and research. First, the stimulus materials (10 slides) made to test Hypothesis #1 (shape, form), Hypotheses #2 (color), and Hypothesis #4 (total synthesis) could have been more distinctive, clear and of greater diversity. Also, live action would be better than stills. Second, a control group to compare effects of the opposite placement of visual materials within the field could be employed. Third, greater control and measurement of the visual in terms of their particular geometric figures must be applied. Fourth, biometric, rather than formative research techniques would have produced more accurate and generalizable results.

The findings of this study show strong implications for establishing a unified policy regarding visual literacy in children. Such a policy would underline those carefully studied and empirically tested variables (visual media factors) which will comprise the language of visual communication media.

"Childrens' perception of certain shapes, forms or patterns of visual stimuli is affected by their asymmetrical placement within the left or right side of the visual field, along with the degree of the visuals' clarity and simplicity."

References

Acker, S.R. and R.K. Tiemens. Children's perception of changes in size of television images. *Human Communication Research*, 1981, *7*, 340-346.

Alexander, K.R. and M.S. Shansky. Influence of hue, value and chroma on the perceived heaviness of colors. *Perception and Psychologists*, 1976, *19*, 72-74.

Anderson, P.A., et al. Implications of a neurophysiological approach for the study of non-verbal communication. *Human Communication Research*,

TABLE 1

Summary of All Scores Obtained From Each of the Four Hypotheses

Tests	n	df	Left Placement Total	M	sd	Right Placement Total	M	sd	t
1. Perception of Shapes	48	47	107	2.23	1.39	64	1.33	1.39	4.51*
2. Perception of Colors	48	47	77	1.60	1.08	60	1.25	1.08	2.24
3. Retention of Visuals	48	47	247	5.15	1.04	167	3.48	1.04	11.13*
4. Preference of Total Synthesis	48	47	929	19.35	4.77	569	11.85	4.77	10.87*

*p = .01

TABLE 2

Comparisons of the Scores of Left vs. Right Placement of Visuals

Test Items	Placement of Visuals	#1 Predominant Shapes, Forms	TOTALS	#2 Predominant Colors	TOTALS	#3 Visual Retention Shapes/Colors	TOTALS	#4 Preference of Total Syntax of Visuals	TOTALS
1	R	Circles	27	A Mix/Yellow	13	Rectangle/Brown	R 41	Circles/A Mix	143
2	L	Circle	13	Black/A Mix	8	Circle/A Mix	L 44	Circle/Black	165
3	L	Circle	12	A Mix/White	5	Circle/Blue	L 46	Circle/A Mix	146
4	L	Circle	16	A Mix/Black/ White	9	Other Shapes/ A Mix	R 40	Circle/A Mix	118
5	L	Other Shapes	18	A Mix/Yellow	24	Rectangle/Green/ Yellow	R 45	Other Shapes/ A Mix	151
6	R	Other Shapes	10	A Mix/Yellow	16	Other Shapes/ A Mix	L 39	Other Shapes/ A Mix	167
7	R	Rectangle	9	Green/Yellow	26	Circle/A Mix	L 38	Rectangle/ Green/Yellow	126
8	R	Rectangle	18	Brown/A Mix	5	Rectangle/ Yellow/Green	L 43	Rectangle/ Green	133
9	L	Rectangle	13	Yellow/Green	26	Circle/A Mix	R 41	Rectangle/ Yellow	154
10	L	Circle	35	Blue/A Mix	5	Circle/A Mix	L 37	Circle/ Blue	195

1981, *7*, 340-346.
Arnheim, R. *Art and visual perception*. Berkeley: University of California Press, 1969.
Baggaley, J.P. and S.W. Duck. "Experiments in ETV: Effects of adding background." *Educational Broadcasting International*, 1974, *7*, 1-4.
Birren, F. *Color psychology and color therapy*. New Hyde Park, N.Y.: University Books, Inc., 1961.
Birren, F. *Color in your world*. New York: The MacMillan Co., 1962.
Bloomer, C.M. *Principles of visual perception*. New York: Van Nostrand Reinhold Co., 1976.
Boynton, R.M. Color vision. *Experimental Psychology* (3rd ed.). New York: Holt Reinhold and Winston, Inc., 1971, 315-322.
Bruning, J.L. and B.L. Kintz. *Computational handbook of statistics*. Glenview, Ill.: Scott, Foresman and Co., 1964.
Cochran, L.M. et al. Exploring approaches to researching visual literacy. *Educational Communication and Technology Journal*, 1980, *28*, 243-266.
Coldevin, G.O. Experiments in TV presentation strategies: Number 1. *Educational Broadcasting International*, 1978, *11*, 17-18.
Coldevin, G.O. Experiments in TV presentation strategies: Number 2. *Educational Broadcasting International*, 1978, *11*, 158-159.
Heber, R.N. (ed.). *Contemporary theory and research in visual perception*. New York: Holt, Rinehart and Winston, Inc., 1968.
Herbener, G.F. et al. Dynamics of the frame in visual communication. *Educational Communication and Technology Journal*, 1979, *27*, 83-88.
Hochberg, J.E. *Perception*. (2nd ed.). Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1978.
Hurvich, L.M. and D. Jameson. *The perception of brightness and darkness*. Boston: Allyn and Bacon, Inc., 1966.
Kling, J.W. and L.A. Rigges (eds.). *Experimental psychology* (3rd ed.). New York: Holt, Reinhart and Winston, Inc., 1971.
Levie, Howard W. A Prospectus for instructional research in visual literacy. *Educational Communication and Tecnology Journal*, 1978, *26*, 25-36.
Mayer, Tom. Tech memos: TV monitor placement. *Pacesetter*, 1973, *6*, 4.
Metallinos, N. Empirical studies in visual communication: Experimental studies on television composition. Paper presented to the 12th Annual Conference of the International Literacy Association, Washington D.C., November 8, 1980.
Metallinos, N. and R.K. Tiemens. Asymmetry of the screen: The effect of left versus right placement of television images. *Journal of Broadcasting*, 1977, *21*, 21-33.
Murch, G.M. *Visual and auditory perception*. New York: The Bobbs-Merrill Co., Inc., 1973.
McCroskey, J.C. et al. *An introduction to international communication*. Englewood Cliffs, N.J.: Prentice Hall, 1971.
Niekamp, W. An exploratory investigation affecting visual balance. *Educational Communication and Technology Journal*, 1981, *29*, 34-48.
Ornstein, R.E. *The nature of human consciousness: A book of readings*. San Francisco: W.E. Freeman and Co., 1973.
Piaget, J. *The construction of reality in the child*. New York: Ballantine Books, 1974.
Pinkerton, E. and N.K. Humphrey. The apparent heaviness of colors. *Nature*, 1974, *250*, 164-165.
Ragan, T.A. Visual literacy and the brain. Paper presented at the National Association for Educational Communication and Technology, Miami Beach, April 25-29, 1977.
Shevrin, H. Glimpses of the unconscious. *Psychology Today*, 1980, *13*, p. 11.
Taylor, J.F.A. *Design and expression in the visual arts*. New York: Dover Publications, Inc., 1964.
Trotter, R.J. The other hemispheres. *Science News*, 1976, *109*, 218-223.