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ABSTRACT

The airing of "Sesame Street" on Israeli television in 1971 provided an opportunity to study the effects of a sophisticated media format on a media naive audience. Samples of 93 kindergarteners and 224 second and third graders of mixed socioeconomic background were pre- and posttested for cognitive skills and media literacy. After viewing the program, data were collected, and researchers attempted to define the relationships between viewing time, enjoyment, comprehension, and demographic characteristics. This volume summarizes in detail: (1) the background of the study and its subjects; (2) the research design; (3) measurement techniques; and (4) results of the research. (EMH)

SESAME STREET IN ISRAEL:
ITS INSTRUCTIONAL AND PSYCHOLOGICAL EFFECTS ON CHILDREN

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June 1974

PREFACE

Sesame Street was shown on Israeli television in the fall and winter of 1971-72. When it became known that Sesame Street was about to be broadcast, the curiosity of researchers at the Hebrew University of Jerusalem arose because the broadcast provided unique opportunity to study the effects of a highly sophisticated television program on television-unsophisticated children. The study was initiated under tremendous time and financial pressures, and it would never have been carried out without the devotion of Lewis Bernstein, Sol Eaglstein, Deborah Malve, Allen Mintzberg, Rachel and Ilana Finkelstein, and Leora Welner.

The Children's Television Workshop (CTW) could at that time provide us only with moral encouragement and we were (and are) thankful for that. At times, we needed that encouragement very badly. Since CTW had no real connection with the study, it is therefore not responsible for the present report.

We are also thankful to Ne'omi Biran for translating the original report from the Hebrew.

G.S.

Jerusalem
June, 1974

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SUMMARY OF FINDINGS

The program of Sesame Street was brought to Israel in the fall of 1971. Forty of its first shows were broadcast twice a week in the five months broadcasting season starting November 1971 and ending in April 1972.

Since the program was never designed for a television-unsophisticated audience like Israeli children, we decided to investigate its effects on children in two fields: the original goal areas, and the area of media-literacy. The latter, it was hypothesized, would be affected by the program's presentation formats which were extremely novel for Israeli children and hence psychologically demanding.

The project consisted of a field study in which 93 kindergarten (KG) and 224 second and third grade children were pretested, tested for amount of exposure during the season, and then post-tested at the end of the broadcasting season. About half the children were of lower SES (LC), and half of middle class (MC) homes. The KG sample was also randomly divided into two groups. The mothers of one group were encouraged to co-observe the shows with their children each time they were aired. The other group was left to view the program as it pleased.

The project consisted also of small group observations in which measures of attention and inattention to the program's

segments as well as active-participation in it were taken.

The pre- and posttest battery for KG children consisted of eight tests originally designed by ETS, such as the Test of Classification, Parts of the Whole, Number Matching, and the like (Ball & Bogatz, 1970). The battery for school children included two of the above tests in addition to five other tests assumed to measure various skills related to media-literacy.

Exposure to the program was measured on six occasions during the broadcasting season. Measures were taken on viewing, enjoyment and comprehension of the show aired on a preceding day. These were supplemented by a 12-item Sesame Street Test, pertaining to major sequences shown in the program during the season. The test was administered together with the posttests.

All tests were individually administered by trained personnel in the KG, and group administered in the schools.

Six children of each age and SES sub-group took part in the small group observations. The children observed four shows (in four weeks intervals) in groups of six. Their behavior was recorded by six observers on a minute-to-minute basis.

The absence of an adequate no-Sesame Street control group required that step-wise regression analyses be performed on the data. Such analyses provided for the prediction of posttest variance by the measures of exposure, after controlling for (partialling out) those portions of the variance which were

accounted for by the various background and pretest measures. Thus, the "net" contribution of exposure to posttest variance could be studied, and parallel groups (e.g., KG LC with KG MC) could be compared on size of posttest variance attributable to exposure.

1. Findings on Exposure

The measures of viewing, enjoyment and comprehension became increasingly intercorrelated as the season progressed, suggesting that at the beginning of the season children watched the show and enjoyed it without necessarily comprehending it. The measures were more strongly interrelated among MC than among LC children. This suggests that the latter, although not significantly less exposed, had difficulties comprehending the program.

Age was positively correlated with viewing, enjoyment and comprehension in the LC group but hardly at all in the MC group. Similarly, father's occupational level was correlated with comprehension in the KG group. These two findings tend to confirm the expectation that the program was rather demanding and that younger and lower SES children had more difficulty in adjusting to the novel formats of the program.

There was a general decrease in the amount of viewing reported by the children as the season progressed (from 56% who claimed to have watched the entire show aired on a preceding day in the beginning of the season, to 37% in the end). LC children started out viewing the show less than MC ones, but as time

passed, they became heavier viewers and finally viewed more than MC children. The same pattern appeared with the KG group as compared with the school group. Enjoyment, likewise, decreased gradually, and as with viewing, LC and KG children, who initially enjoyed the shows less than older and MC children, ended up overtaking them.

Comprehension of the shows was quite poor in the beginning, but it improved with time. MC and school children were found to comprehend the shows better than KG and LC children, but they manifested a sharp decrease in comprehension (in fact, a decrease of viewing and attention due apparently to boredom) while there was an increase in comprehension by KC and LC children.

In general, then, exposure to the program was heavy while comprehension stayed behind. The overall pattern is one of gradual loss of interest in the program on the side of older and MC children and an increase in viewing, enjoyment and comprehension by KG and LC children.

The small group observations of attention, inattention and active-participation showed a general increase in active-participation and a decrease in inattention to the shows' segments. This apparently reflected the children's increased familiarity with the program's figures and formats. A more detailed analysis showed that while Grade 3 MC children become gradually less actively involved in the show, G-3 LC children increased their active involvement. Thus, the small group observations replicated the findings based on the periodic measurements of exposure.

An analysis was conducted to distinguish between the more interesting (active-participation gaining) and boring (inattention gaining) segments. After some further analyses we reached the conclusion that segments with a strong didactic component or segments whose critical information is on the sound track are the boring ones. On the other hand, a strong visual component with much visual variability and the absence of direct teaching are typical of the interesting segments.

2. Findings on the Program's Effects on KG Children

The data were analyzed as described above by the method of step-wise regression with a fixed order of entered variables.

After 21.9% to 53.7% of the posttests' variance (depending on the specific test) were partialled out, it was found that exposure to the program accounted for another 3.8% to 13.3% of the variances. The smallest effect[1] of exposure was on scores of the Test of Relational Concepts, and the largest on scores of the Test of Parts of the Whole.

There were systematic differences between the tests on which LC children gained the most and those on which MC gained the most from the program. The former gained more on the various Matching tests while the latter gained more on the tests of Classification and Parts of the whole. It was hypothesized that

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[1] The terms "effect" or "gains" are used here for simplicity of reporting. We are fully aware that accounted for variance does not necessarily imply a casual relationship.

the Matching tests call more upon visual discrimination and analysis, suggesting that LC children learn more in that area. On the other hand, the Tests of Classification and Parts of the Whole require more synthesis and abstraction, an area in which MC children excel.

We reasoned that if this was the case, and if analysis precedes synthesis, as often claimed, then early achievements in analysis should predict later achievements in synthesis, but not vice versa. Crossed-lagged-panel analyses of correlations between pre- and posttest achievements upheld this hypothesis. Thus, we could tentatively conclude that LC children gain more in the area of visual analysis and discrimination because it is hierarchically more basic than synthesis. MC children are more susceptible to changes in the area of synthesis and abstraction, having manifested an adequate (but not optimal) prior mastery of analysis.

3. Findings on the Encouragement of Mothers

The encouragement of mothers to co-observe the shows with their children had an overall moderate effect on patterns of exposure. It had a particularly profound effect on the amount of the LC children's enjoyment of the program. It had hardly any effect on MC children.

Encouragement affected posttest scores of LC children when exposure was not held constant. When exposure was partialled out, encouragement did not account for posttest variance, suggesting that the effect of encouragement on achievements was indirect

it affected exposure, which in turn accounted for achievements. This, however, was the case mainly with LC children. From among the various components of exposure, it was enjoyment which was most affected.

Thus, as it turned out, the encouragement of mothers had mainly an affective influence inasmuch as it increased the LC children's enjoyment and consequently their posttest achievements.

Another finding was that while in the Non-Encouraged group, SES was a strong predictor of posttest scores, its power was substantially reduced in the Encouragement group. There, the gap between LC and MC children was dramatically reduced. It was concluded that the encouragement of mothers to co-observe the program with their KG children makes the LC (but not the MC) children gain more and hence be more similar in their achievements to MC children.

4. Findings on the Program's Effects on School Children

The test battery for the school children consisted mainly of media-literacy tests and only two tests of the original goal areas were retained (Classification and Parts of the Whole).

Unlike the KG group, no large differences were found between the initial achievements of LC and MC children. However, SES became a differentiating factor with respect to exposure and to posttest achievements. As was found in the analysis of the exposure and attention data, LC children viewed and enjoyed the program somewhat more than MC children. However, MC children still knew

more of the program's contents, as measured by the Sesame Street Test, than LC ones. MC children were also the ones to profit more from the program in all areas but on Field Independence. In this area, which is known to require analysis, LC children benefited slightly more. Indeed, crossed-lagged-panel analysis of correlations reconfirmed our hypothesis as to who gains more in what area.

School children, generally, were more affected by the program than KG children. They also viewed the program more and comprehended it better than KG children. It was also found that their achievements were less contingent upon prior knowledge and home background factors than those of KG children, allowing them apparently to be more susceptible to external stimulation.

Achievements in media-literacy were affected by exposure to the program, but to a lesser extent than achievements in the original goal areas. While media-literacy scores were not associated with scores in the goal areas at the outset, they became more strongly correlated at the end of the season. This was the case among the heavy viewers, but not among the light viewers, suggesting that learning the contents of Sesame Street was related to improvement in media-literacy.

BACKGROUND CONSIDERATIONS

1. Introduction

The original version of Sesame Street, designed at the time for American preschoolers, capitalized on televiewing habits and information processing skills which were characteristic of the American TV generation. The program was therefore never intended to be transferred to non-English speaking countries whose populations, like Israeli children, are only slightly familiar with television, and completely unfamiliar with the American style of commercial-like television. The few programs they watch are usually old fashioned, and without the familiar American one-minute spots shown between the programs.

When, in spite of these limitations, Sesame Street was brought to Israel, a number of questions were raised with respect to its potential effects on Israeli children. In fact, the introduction of the program provided a rather unique opportunity for the investigation of the effects of a highly sophisticated program on children who are anything but media-literate.

2. Media-Literacy, Skills and Knowledge

Media-literacy may be conceived of as the mastery of mental skills which are needed for the extraction and processing of information conveyed in coded form. Such codes, or let us call

them presentation formats, call upon mental skills in whose absence conveyed coded information could not be properly extracted and processed.

No doubt that the medium of television in general, and the American style of commercial-like program, in particular, conveys messages through very specific (often rather unique) presentation formats. Take for instance the rapid, mosaic-like structure of a typical Sesame Street show. It resembles neither the format of feature films, nor even that of more traditional television programs for children. It would, therefore appear reasonable to assume that it takes some previous experience with such television formats, or at least some prior mastery of the relevant mental skills, to be able to comprehend a Sesame Street show. This is not meant to imply that other environmental agents do not cultivate similar mental skills. Yet as cross-cultural research implies, the exposure to media may be a dominant (not exclusive) agent in the cultivation of media-literacy skills.

Media-literacy skills may vary with respect to their transfer value, or generalizability. They may range from highly specific skills whose sole function is to aid in the extraction of information from a particular medium, to skills which, once acquired, serve in many different capacities and contexts. It is in the latter sense that media-literacy is dealt with here. As Olson (1973) indicates, performing an act of, say, drawing a chair, may teach both about chairs (knowledge) as well as about drawing in general (skill). Similarly,

one could claim that performing the acts of extracting information and meaning from a coded medium presentation both teaches the conveyed knowledge and improves the skills of extracting that knowledge.

However, for such learning to take place, the stimuli must engender some measure of novelty (e.g., Day & Berlyne, 1971). Presumably, to acquire knowledge, this novelty must be contained in the content of the presented materials; but to develop mental skills, novelty ought to be entailed in the presentation formats. When Sesame Street was initially planned and structured, the existing skills of American preschoolers were taken into consideration so that the program's formats would not entail too much novelty for them. On the contrary, the program was expected to capitalize upon television-related mental skills rather than to shape or cultivate new ones.

Novelty of presentation formats was, perhaps, the most salient feature characterizing Sesame Street when it was introduced Israeli children. This is not to say that the program's content did not entail any novelty for Israeli preschoolers; indeed it did. However, content material such as numbers, relational concepts, body parts, classes, and the like, are universally a part of preschool education. Thus, no five-year-old in either the U.S. or Israel is completely unfamiliar with such knowledge. The more striking novelty an Israeli child could be expected to face when encountering Sesame Street was in the formats in which those contents were presented.

In light of the above we hypothesized that exposure of Israeli children to Sesame Street would lead to (1) the acquisition of the presented knowledge, as well as (2) the development of specific media-literacy skills. However, the acquisition of the knowledge in the intended instructional goal areas of the program could be expected to depend, to some extent, on concurrent improvements in media-literacy skills. Without the latter, little knowledge could be extracted and processed from the program. We would therefore expect the two to develop hand in hand.

3. Mechanisms of Skill Learning

How do media-literacy skills develop? What are the components of "exposure" which ensure such cognitive modifications? Previous experiments (Salomon, 1972; 1974) suggest that at least two mechanisms, which correspond to functions of television or film formats, may account for changes in media-literacy.

One type of presentation format calls upon, or activates, specific skills without which meaning can not be extracted. For instance, showing a series of seemingly unrelated segments will tend to activate in the viewer processes which relate the segments to one another. Similarly, a presentation which moves abruptly and frequently from close-up to long-shots will require the viewer to activate mental processes which relate the blown-up segments to the view of the broader long-shot. When such skills are repeatedly activated and lead to the extraction of meaning, thus reinforcing the act, gradual improvements in the mastery of

the skills can be expected.

As our research has shown, such improvements do not take place uniformly in all learners. For activation of a skill necessitates the existence of some initial (although less than optimal) mastery of that skill. How else could it be activated? It thus is both theoretically expected as well as empirically supported by our findings, that only learners with initially moderate mastery of such a skill show skill improvements as a result of exposure to media formats which activate skills.

The second function that formats can accomplish is that of modeling a skill explicitly, or as we have termed the process, supplanting it. For instance, a format may show very explicitly a transformation in space (e.g., moving around an object showing its many appearances), thus explicitly performing an operation for the viewer which he ought to execute covertly on his own. Such supplanting apparently allows imitation and internalization to take place. As has been shown, learning takes place mainly by learners who initially master poorly the mental skill so modeled. Better skilled learners on the other hand feel "spoon fed." Moreover, the very explicit modeling tends to interfere with their already existing mastery of the skill.

Examining Sesame Street, we find that a good many novel presentation formats are used. Some, such as discontinuity of segments or abrupt shifts from a close-up to a long-shot, may activate skills. Others, such as zooming in and out, moving around objects, and the like, would probably tend to supplant

skills. In light of this, we expected initially better-skilled children to become more media-literate in skills which are activated, while the less skilled ones would improve in skills which are supplanted.

4. Learning in the program's original goal areas

Differential effects of Sesame Street were expected to occur not only in the area of media-literacy but also in the instructional goal areas of knowledge. The American evaluation projects of Sesame Street (Ball & Bogatz, 1970; Bogatz & Ball, 1971) did not deal with such differential effects. Rather, their focus was on the extent to which the program's objectives were attained in general. Such an evaluation is not really applicable to the present study as the program was not designed for the Israeli population. Obviously, Israeli children could learn something, but one would be hard-pressed to determine whether this indicates "much" or "little" learning. Disregarding absolute levels of learning, it would still be desirable to ask who learns more, and in which goal areas? Since the instructional contents of the program are universal, findings about differential effects could be of a generalizable nature.

Indeed, a rich and variable program such as Sesame Street may allow different children to benefit in different areas. Children may profit more in areas in which they are already knowledgeable, or they may profit more in areas in which their deficiencies are largest. Alternatively, improvements may take

place in areas which are hierarchially more basic than others. The present study provided a unique opportunity to examine these possibilities.

5. External Intervention

If novelty is the most salient characteristic of Sesame Street in Israel, then one would expect the show to be quite demanding. Messages which are presented through yet unfamiliar formats may not be well comprehended. Difficulties of this sort would be manifested mainly by children with relatively poor initial mastery of the necessary media-literacy skills, or of the basic knowledge of which the new knowledge is to be added, or both. They may therefore enjoy the program less as the season progresses and decrease their amount of viewing.

Would it then make a difference if external intervention is introduced? More specifically, would the presence of mothers, who co-observe the program with their children, lead to more viewing, better comprehension, and to more learning?

Gursec (1973) has shown that co-observation by mothers increased the degree to which five-year-olds were influenced by a model. Other studies have shown that mothers who were trained to tutor their children enhanced their children's learning. However, even untutored co-observing mothers could make a difference, particularly if enjoyment and comprehension of the program are expected to be crucial for learning to take place.

6. The Major Questions of the Study

In light of the above discussions, the following three major questions were asked:

1) Does exposure to the program enhance the development of specific skills related to media-literacy?

2) Who learns more and who learns less in what goal areas of the program?

3) What are the effects of encouraging mothers to co-observe the program with their children?

Answering these questions required a rather elaborate research design as well as the gathering of a large quantity of data. The data also allow us to answer additional secondary questions such as: Who watched the program more and who watched less? How are viewing, enjoyment and comprehension interrelated? How do they change with increasing exposure to the program? How do patterns of attention to the program's segments change over time? What makes a segment "interesting" and what makes it "boring"? Which of the various manifestations of "exposure" is the one which contributes most to learning?

RESEARCH DESIGN

To answer the questions mentioned above and to gather the additional necessary data, two studies were conducted: a field study (N=317) in which the effects of the program were examined, and small group observations (N=36) in which attention patterns to program segments were recorded.

1. The Field Study

a. General Description

A study such as the present one presents certain problems which are difficult to overcome via a traditional experimental design. Since the study concerned a television program which was broadcast all over the country it was difficult, if not impossible, to find an adequate control group which would not be the result of self-selection. It was certainly impossible to form an artificial division of "experimental subjects" and "control subjects" since we could not prevent children from watching the program. Even if we were able to do so, we would probably have found out, as was found out by Bogatz & Ball (1971), that "control subjects" sneak out and manage to watch the program despite the prohibition.

Specific statistical methods, however, allow us to overcome this difficulty. If one wishes to talk about changes in knowledge and skills which are presumed to be associated

with program viewing, then each child's level of exposure to the program can be measured and the degree to which exposure is related to later achievement can be computed. Actually we have a situation where the independent variable (exposure) has values distributing over a wide range: from total non-exposure, through many levels of partial exposure, to total exposure to each and every broadcast. In this respect we have an advantage over the traditional experimental design in which subjects are divided into groups of "viewers" and "non-viewers." The traditional method usually avoids looking into differences within each one of the groups, whereas here they are taken into account.

But there is in this method a certain threat to internal validity, since it is certainly possible that children who are more exposed to the program are also those with a higher initial level of skill and knowledge. Their higher scores at the end of the program's season may in fact be the result of their initial achievements rather than the result of their exposure to the program. The statistical method of multiple regression allows us to partial out the contributions of background and initial achievement variables, thus measuring the "net" contribution of exposure to the measured achievement and skills at the end of the season (Cohen, 1968). In other words, with this method it is possible to specify the amount of "influence" (in terms of common "net" variance) that exposure to the program has on achievement and skills, having partialled out the contribution of the initial achievements and skills.

The method of multiple regression allows for the measurement of all those background and initial achievement variables which may account for some sizable amount of posttest variance. Once partialled out, and the claim of "other things being equal" statistically satisfied (to an extent), the major independent variable can be entered. Its contribution to posttest variance can then be examined.

In view of the above, the field study was done in three stages:

Stage 1: (PRETEST). The determination and measurement of background variables likely to be related to viewing, initial achievements, and skill mastery before the onset of the program.

Stage 2: (EXPOSURE). Continuous measurement of children's exposure to the program, done on six occasions during the broadcasting season.

Stage 3: (POSTTEST). Measurement of achievements and skill mastery at the end of the broadcasting season.

b. The Subjects

The subjects in the field study were 371 kindergarten, second and third grade children from the Jerusalem area. About 41% of the children were of lower SES (LC) and the remaining 59% were middle class (MC). The sampling of the children was accomplished in the following way. From all the neighborhoods in the Jerusalem area four were chosen: two of them were lower

class, low income neighborhoods, while the other two were well-to-do middle class ones. From each such neighborhood one local kindergarten and one school were randomly selected, thus providing us with a total of four kindergartens (2 LC and 2 MC), and four schools. From each school one G-2 and one G-3 classroom was selected, thus providing us with two LC Grade-2 classes, two MC G-2 classes, two LC Grade-3 classes and two MC G-3 classes.

Of the 371 children who were pretested we were able to secure all the data pertaining to the two subsequent stages from 317 children.[2] The overall sample and its division according to age and SES is presented in Table 1.

Table 1: Division of Children in the Field Study According to Age and SES

	LC	MC	TOTAL
KG	50	43	93
G-2	40	66	106
G-3	42	76	118
Total	132	185	317

[2] Examination of the data of the children who were not available for later testing did not suggest any bias of the remaining sample.

c. The Encouragement of Mothers[3]

All the children in the study watched the program voluntarily in their homes. However, to examine the effects of mother co-observation, approximately half the mothers of the KG children were urged to watch the program together with their children. The mothers in the encouragement group were gathered twice during the broadcasting season: once at the beginning and a second time half way through the season. During these meetings the instructional goals of the program were explained and the mothers were urged to watch with their children whenever the program was broadcasted. Mothers complained later on that co-observing the program with their children interfered with daily routine and homemaking, thus indicating that they complied with our request. No other measures of amount of co-observation were taken as we did not wish to introduce any additional extraneous variables, such as observers at home.

The encouragement group consisted of 50 children and the non-encouraged of 43. The two groups were divided approximately in half according to SES.

2. Small Group Observations

Although exposure was measured on six different occasions, a more detailed account of attention patterns and changes thereof

[3] This part of the study has been reported in more detail in a separate paper to be obtained upon request from the author.

was desired. It was expected that the recording of attention patterns as they changed over time would shed some additional light on the findings of the field study. It was also expected that some insight would be gained into the more interesting and the less interesting segments of the program.

Toward these ends six children were randomly sampled from every age and SES group (N=36). These children were invited to watch the program in groups of six on four occasions four weeks apart. The KG children were invited to watch the shows in private homes near their kindergartens, while the school children did the viewing in the TV rooms of their respective schools.

During the broadcast each of six trained observers noted the behavior of one of the six children. Observers recorded on special recording sheets the behavior of the children in three categories:

a) Attention: The child observes the screen.

b) Inattention: The child turns around, talks to another child, walks around, looks into a book, etc.

c) Active participation: The child cheers, sings with a performer, responds to questions in the program, laughs aloud, provides advice to figures on the screen, and the like.

Recording of these behaviors was done on a minute-to-minute basis. One additional observer simultaneously recorded

the minute-by-minute flow of televised segments, while two other observers rated the quality of within-segment English to Hebrew translation.

MEASUREMENT INSTRUMENTS

1. Measurement Instruments Used in the Field Study

a. Background Data

Data on the following variables were collected on all children participating in the field study: age, father's and mother's country of origin, father's occupation, father's and mother's level of education, parents' knowledge of English, number of children in the family, the child's general exposure to movies, his exposure to newscasts on TV, and his exposure to instructional TV broadcasts.

Most of the information was collected through questionnaires sent to the parents by the kindergarten and school teachers. Some data were taken out of each child's file in school or KG.

b. Data on Exposure

As previously stated, the children's exposure to the program was measured on six different occasions with three-week intervals between them. The measures were taken on a day following the broadcasting of a show.

Three factors defined exposure to the program: the instrumental factor (the actual amount of viewing), the affective factor (enjoyment of the program), and the cognitive factor (comprehension and recall of the content). Exposure was thus

measured by viewing, enjoyment, and comprehension. In addition, a fourth measure was taken, consisting of a 12-item multiple-choice test, administered at the end of the season together with the posttests. This was the Sesame Street Test pertaining to the after-the-season recall of salient contents of the program.

Measurement in the KG's was done by personal interview in which each child was asked about the amount of viewing of the program he did the previous day, and how much he enjoyed what he saw. The children gave their answers by pointing to one of four circles: the first one nearly empty, the second half filled, the third 75% filled, and the fourth completely full ("I watched a little," "I watched half the time," "I watched most of the time," "I watched all the time"). In answer to the question of enjoyment of the program, the child pointed to one of three faces: a happy, indifferent, or sad face. Measurement of comprehension was done by 4 to 6 specific multiple-choice content questions (see Appendix 1a). Questions on the end-of-the season Sesame Street Test were taken from amongst the comprehension items (see next section).

In a special questionnaire given to the parents, similar to the one given to the children, the parents were asked about the amount of program viewing their children did the previous day. The correlation between the parents' and the children's answers was .72.

c. Tests for KG

As previously mentioned (see chapter "Research Design"), testing of KG children emphasized the achievements in the original goal areas of the program. The tests in this area were taken from a battery compiled by ETS (Ball & Bogatz, 1970) as part of their evaluation of the instructional effectiveness of the program. Some of the test items were changed or deleted for technical or linguistic reasons. All the tests were given individually by skilled examiners. Two tests (Field Independence and Ordering of Pictures) were assumed to measure skills related to media-literacy, rather than achievements in the original goal areas. The tests were as follows (number of items and Cronbach-Alpha reliability coefficients were presented in Table 2).[4]

(1) Test of Letter Matching (origin: ETS)

In the test children were asked to identify a specific English letter out of three similar incorrect ones, by matching it with a given standard letter. Although this test deals with English letters, it measures in fact the ability to make visual discriminations.

(2) Test of Number Matching (~~Origin:~~ ETS)

Out of three alternative groups of drawn objects, the child had to choose one in which the number of items was identical to the one in a given picture.

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[4] Tests which were adopted from the ETS battery are not given in the appendix. Only items of new tests, developed by us, are exemplified in the appendices.

(3) Test of Picture-Number Matching (Origin: ETS)

The child had to indicate the number of objects appearing in a picture ("There are three turtles here") by counting or by general impression.

(4) Field Independence Test ("Embedded Figures")

This test was adopted to measure one's ability to identify figures embedded in a complex display. It was assumed that certain presentation formats of the program call upon (i.e., activate) such a skill. In particular, we have identified numerous instances in which a particular display, rather rich in detail, was shown followed by a close-up of a detail. The connection between the two was left to be found by the viewer. The test was therefore taken as measuring one aspect of media-literacy. Our test was based on items from Witkin's Children's Embedded Figure Test. For technical reasons, the items were without color. Instead, we had shadings of lines to give different hues.

(5) Test of Relational Concepts (Origin: ETS)

The child had to point to a picture which expressed a relationship stated by the examiner. The items dealt with concepts of size, place, amount, and distance.

(6) Test of Classification (Origin: ETS)

The child was presented with 3 pictures and an empty space next to them. Out of 4 additional picures he had to choose the ones which would fit the empty space. The correct matching was based on class identification. The last items in the test were

basically similar to some of the items on the Raven Matrices Test.

(7) Test of Parts of the Whole (Origin: ETS)

The child was presented with a picture of an object separated into its components, and out of four alternatives he had to choose the picture showing the whole object.

(8) Test of Ordering of Pictures

The child was presented with 4 separated single pictures, had to order them in a logical way and relate the story they tell. Any logical story was accepted as a correct one. The test was considered as measuring a skill related to media literacy.. It was hypothesized that the mosaic-like and discontinuous nature of the program may activate processes of relating discrete elements along some logical lines.

(9) Test of Sesame Street

This test was only given at the end of the season and was designed to measure the child's acquaintance with the prominent contents shown on the program. This test came, therefore, to supplement the rest of the program's exposure measures (Appendix 1b).

As previously stated, all tests (including the exposure questionnaires) were administered individually by our examiners. Each examiner arrived at the KG one day before the day of testing, and stayed at the KG that whole day without testing anyone. Only the next day did she start testing children in a relatively quiet corner of the KG.

Table 2: A Summary of Data on KG Tests

The test	Number of items at the beginning of the season	Cronbach-Alpha Reliability	Number of items at the end of the season	Cronbach-Alpha Reliability
1. Letter Matching	5	.39	8	.65
2. Number Matching	11	.61	11	.81
3. Picture-Number Matching	15	.59	15	.74
4. Field-Indepencence	8	.71	8	.69
5. Relational Concepts	8	.39	8	.37
6. Classification	18	.83	18	.85
7. Parts of the Whole	10	.73	10	.82
8. Picture Ordering	3	.60	3	.61
9. Sesame Street	-	-	12	.87

d. Tests for School Children

In contrast to KG, all tests and questionnaires for school-children were group-administered. Four examiners participated in the administration of the tests, one reading the instructions and the others going around, helping out and watching over the children.

The emphasis in the testing of school children was on the media-literacy measures; however, two tests (the first two below) pertained to the original goal areas of the program.

The tests were as follows (number of items and reliability coefficients are presented in Table 3).

(1) Test of Parts of the Whole (Origin: ETS)

Identical to the one employed in KG.

(2) Test of Classification (Origin: ETS)

Identical to the one employed in KG.

All of the following tests were related to aspects of media-literacy, hypothesized to be affected by the special formats of the program.

(3) Field Independence Test (Embedded Figures)

Identical to the one employed in KG.

(4) Test of Ordering of Pictures

Similar to the test given in KG. The school child was given 4-5 printed pictures arranged randomly on one page. The child had to indicate their logical order, but was not required to relate the story behind the pictures (see Appendix 2a).

(5) Test of Points of View

The child was given a picture of a landscape and had to choose out of 4 alternatives how that same landscape would look from another point of view ("How would the sailor on the boat see the shore?") (See Appendix 2b).

It was hypothesized that children's ability to visualize somebody else's point of view could improve as a result of their exposure to one of the program's formats which supplants the act of going around an object. Children were expected to imitate this and be able to internalize the action.

(6) Test of Figure and Ground

The child was given a drawing composed from many details. He had to enumerate (in writing) "everything he sees in the drawing." Among those he had to identify also the total figure (for example, the number "5" which was composed of a flag, a rod and a sickle). For this identification he received an extra score (see Appendix 2c).

This test was assumed to measure another media-literacy related skill. It was hypothesized that exposure to many acts of zooming in and out on objects supplants the process of singling out a component while not losing the view of the whole array; thus explicitly showing the whole and a component of it in close proximity.

(7) Test of Close-up - Long-Shot

The child was given a picture in which one detail was enlarged, drawn as if it were a "close-up," and had to identify out of 4 alternatives the picture in which the complete object appeared (as if a "long-shot"). Four items were given in this manner while four others were given in the opposite way: A "long-shot" picture was given and the child had to identify a picture showing a detail included in the picture which looks like a "close-up" (see Appendix 2d).

(8) Test of Sesame Street

This test was identical to the one given to KG. As previously stated, it was given only at the end of the season.

Table 3: A Summary of Data on Grade-School Tests

The test	Number of items at the beginning of the season	Cronbach-Alpha Reliability	Number of items at the end of the season	Cronbach-Alpha Reliability
1. Parts of the Whole	10	.74	10	.91
2. Classification	18	.84	18	.82
3. Field Independence	8	.53	8	.78
4. Picture Ordering	4	.31	4	.57
5. Points of View	3	.45	3	.62
6. Figure and Ground	5	.72	5	.65
7. Close-up - Long Shot	8	.53	8	.60
8. Sesame Street	-	-	12	.87

2. Observations in Small Groups

The measurement of three behaviors (attentive, inattentive and active participation), was described earlier. Interviewer reliability on a pre-test in which six viewers participated was .84.

RESULTS

The findings of the study are reported in the following order. First, we present the findings describing the subjects' program viewing patterns and the changes within the patterns during the broadcasting season. These are followed by the findings describing patterns of attention (viewing in small groups) and their changes over time. Following these, we review the findings which deal with the program's effects as they were investigated in the field-study.

1. Exposure to the Program

As mentioned earlier, the extent of program viewing by the subjects was measured by six questionnaires, individually administered in the KG, and group administered in G-2 and G-3. In each questionnaire the children were asked to reply as to (a) their amount of viewing of the program presented the day before ("How much did you watch the program," (b) their extent of enjoyment of the show ("If you saw the program, how much did you enjoy it"), and (c) comprehension of the program by means of 4-6 multiple-choice content questions.

a. The Relationship between Viewing, Enjoyment and Comprehension

The three exposure measures, as they were measured on

six different occasions, are highly intercorrelated with each other (Table 4). It is important to note that these intercorrelations generally increase over time. This is especially noticeable in the correlations between viewing and comprehension and between enjoyment and comprehension.

Table 4: Intercorrelations between Viewing, Enjoyment and Comprehension on Six Different Occasions (N=333)

Occasion	Viewing and Enjoyment	Viewing and Comprehension	Enjoyment and Comprehension
I	.85*	.50*	.49*
II	.88*	.62*	.61*
III	.91*	.72*	.71*
IV	.91*	.75*	.74*
V	.89*	.73*	.71*
VI	.90*	.76*	.77*

* $P < .01$

It becomes evident from these changes over time that at the beginning of the season apparently much viewing took place together with a great deal of enjoyment, without much comprehension of the presented content to accompany them.

As the broadcasting season went on, relationships between viewing and enjoyment on the one hand, and comprehension of the presented content on the other, became stronger.

Thus there is evidence to support our initial assumption that the program was initially demanding. Moreover, it becomes clear that even a lot of program viewing is not enough to ensure comprehension of the content. Comprehension comes, apparently, only after a period of adjustment.

When the subjects are divided into the lower SES (LC) and the middle-class (MC) groups, we find systematic differences between them. Correlations between viewing and comprehension on each occasion are a little lower in the LC than in the MC group (Table 5). In both groups the correlations become higher over time, but the difference between the groups remains.

These differences suggest that while viewing of the program was associated with its comprehension rather early in the MC group, it took time of adjustment for the LC group. The latter watched and enjoyed the program but comprehended it to a lesser extent.

Table 5: Intercorrelations between Viewing, Enjoyment and Comprehension on Six Occasions, Among LC and MC

	Occasion	Viewing and Enjoyment	Viewing and Comprehension	Enjoyment and Comprehension
I	MC	.85*	.55*	.52*
	LC	.86*	.47*	.50*
II	MC	.90*	.75*	.73*
	LC	.86*	.53*	.54*
III	MC	.91*	.83*	.78*
	LC	.90*	.62*	.67*
IV	MC	.92*	.85*	.84*
	LC	.89*	.65*	.65*
V	MC	.88*	.82*	.78*
	LC	.90*	.62*	.64*
VI	MC	.89*	.85*	.84*
	LC	.91*	.66*	.70*

* $P < .01$

Another difference between the LC and the MC groups is found in the correlations between the different exposure measures beyond the six occasions. For example, we find that the correlation between viewing of the program in December and viewing in February, is .41 ($P < .01$) in the LC group, while it is only .08 among MC; in the LC the correlation between comprehension at the beginning of February and comprehension in March is .40 ($P < .01$), but only .06 in the MC group; the correlation between enjoyment in January and enjoyment in February is .37 in the LC ($P < .01$), and only

0.7 in the MC group, and so on. It seems that there is much more consistency among the LC than among the MC. LC viewers who watch at one time will also tend to watch at a different time, and those enjoying the program at one time will tend to enjoy it at another time. There is less consistency among the MC. The MC child watching at one time will not necessarily watch at a second time, etc. However, when watching the program, MC children comprehend it better then LC.

Another interesting point is the correlation between the children's ages and their overall mean scores of viewing, enjoyment and comprehension of the program. Among the LC there are consistent positive correlations between age and the above mentioned variables, while among MC these correlations are much lower (see Table 6).

Table 6: Correlations between Mean Viewing, Enjoyment and Comprehension Scores with Age, Among LC and MC

	LC	MC	Difference
Age and overall mean Viewing	.49**	.22*	P .05
Age and overall mean Enjoyment	.42**	.009	P .01
Age and overall mean Comprehension	.66**	.41**	P .05

* $P < .05$
** $P < .01$

While age contributes to the LC child's exposure to the program, it does not contribute much to that of the MC child. This provides further support for the assumption that the program was rather demanding, creating difficulties especially for the LC younger child.

The intercorrelations between the father's occupation and the comprehension measures reveal still another pattern of special interest. Usually there is some relation between the father's occupational level and the number of books in the house, the family's income, housing conditions etc.

Table 7: Correlations between Father's Occupational Level and Comprehension Scores on Six Occasions in the Different Age Groups

Occasion	KG	G-2	G-3
I	.23*	.24**	.34**
II	.33**	.22*	.30**
III	.24*	.13	.04
IV	.34**	.07	.14
V	.33**	.18*	.12
VI	.28**	.02	.07
Overall Comprehension Mean Score	.45**	-.09	-.24*

* $P < .05$
** $P < .01$

We find that in the beginning of the season, father's occupation is related to comprehension in all age groups (Table 7). However, whereas for KG children the correlation stays put as the program progresses, it disappears in the older age groups. In other words, among the older children, home background ceases to play a role in the comprehension of the program as time passes. Thus, younger children whose fathers have higher occupations appear to have an initial advantage over those whose fathers have occupations somewhat lower on the scale. This is the case for all children in the beginning of the season while it remains so later on only for the KG group.

The difference between the age groups is especially noticeable in the correlation between the father's occupation and the overall comprehension mean score. Among KG children the correlation is .45 ($P<.01$), among G-2 it is -.09 and among G-3 it is -.24 ($P<.05$). This finding and the correlations between age and viewing, enjoyment and comprehension that were found to be higher among the LC, provide evidence (although not conclusive) that the program was indeed highly demanding. Thus, older children or children who come from homes whose general educational level is higher, appear to have a relative advantage. They comprehend the content of the program earlier than younger children or children with a poorer educational background.

In summary, we find that the relations between viewing and comprehension, and the relations between enjoyment and

comprehension - tend to become stronger as exposure to the show accumulates. But the increase is more profound in the MC than in the LC group. Among the latter, viewing and enjoyment have a weaker tie with comprehension than among the former. The LC group, which on the average does not watch the show less or enjoy it less, comprehends it less well than the MC group.

In contrast to that, the relations between the measures beyond the different measuring occasions are stronger in the LC group than among the MC. The former appear to be more systematic in their exposure to the program, while the latter are less systematic. It was also found that among the LC the child's age has a much greater contribution to the comprehension of the show, than among MC. Among the latter, we found that children of different ages tend to be exposed to the program to a similar extent. We also found that among KG children the father's occupation has a greater contribution to the comprehension of the show than among G-2 children, and even more so than among G-3 children. This provides evidence that the show is very demanding on small children and on lower SES ones.

b. Viewing the Program

Based on the children's reports on the six measuring occasions, we find that on the average only 9% of the children did not watch the program at all, while 49% said they watched the entire program. However, over time, there was a general downward trend in viewing: from 56% who viewed the whole program

in the beginning to 37% toward the end of the season. In contrast to that, there was an upward trend (from 17% to 32%) in the percentage of viewers who watched only a quarter of each broadcast (see Table 1 in Appendix 3). This provides evidence that the program called upon mental processes in younger and LC children who were not initially skilled with these processes.

Within this overall downward trend, two specific patterns emerge. LC children who, in the beginning, watched the program less than MC children, began exceeding the latter as the season progressed. Toward the end of the season there were more MC children who did not watch the show at all or only a quarter of it than LC children (46% and 39% respectively). At that time there were also more LC children than MC ones who watched the entire show or three quarters of it (56% versus 49%, as detailed in Table 2 in Appendix 3).

c. Enjoyment from the Program

On the average, the percentage of children who enjoyed the program was larger than the percentage of non-enjoyers (56% versus 30% respectively). This average percent of children enjoying the program is similar to the percentage reporting having seen the entire program, and the overall correlation between the two is .66.

There was a gradual decline in the percentage of children who enjoyed the program (see Table 4 in Appendix 3): from 62% who enjoyed the show "very much" at the beginning of

the season to 46% at the end. The decline in enjoyment is somewhat sharper among the MC than among the LC children (among the former: a decrease from 63% who enjoyed the show very much at the beginning to 40% who enjoyed it very much at the end; among the latter: from 61% at the beginning to 54% at the end). We also find that while at the beginning of the season KG children enjoyed the show less than G-2 and G-3 ones, the former exceeded the latter at the end of the season (see Tables 5 and 6 in Appendix 3).

The findings on enjoyment are very much in agreement with the findings on viewing, confirming the general trend: younger children and LC children see less of the program and enjoy it less at the beginning of the season, but after a period of adjustment the amount of viewing and the amount of enjoyment increases over that of the older and MC children. There is, however, an overall decline on both variables.

d.. Comprehension of the Program's Content

On the average, the percentage of children who could not answer more than one questions was 37.5%. This percentage is relatively high considering that the percentage of children who did not watch the program (according to their own report!) was on the average only 9%. (The program remained basically in its original English-language version with a minimum of explanatory narration in Hebrew. This too may account for the low rate of comprehension of the program's content.) The

average percent of children who were able to answer all of the questions in the questionnaires was 37%. This average percent is low in comparison to 49% of the children who claimed to have seen the entire program.

In general, there was a slight decrease in the percentage of children who could answer all of the content questions toward the middle of the season, but the percentage increased again toward the end (see Table 7 in Appendix 3). At the end of the season 34% of the children (compare with 17% in the beginning) were able to answer all of the content questions.

During the whole season, MC children showed better comprehension of the program than LC children. But among the MC there was a substantial decrease in comprehension scores[5] (similar to the decrease in amount of viewing and enjoyment), while there was a systematic increase among the LC children. At the end of the season the initial gap between the two groups was greatly reduced (see Table 8 in Appendix 3).

Similar changes appeared among the different age groups. KG children comprehended the program's content to a lesser extent than G-2 and G-3 children at the beginning of the season. However, comprehension of KG children improved gradually toward the end

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[5] This should not be erroneously interpreted. The decrease in comprehension scores implies a decline in attention to the program's shows and a loss of interest in its contents.

of the season, while the scores of the latter decreased (Table 9 in Appendix 3).

There is additional evidence for the existence of these contrasting trends to be found in the comparison of the comprehension changes among LC children of different age groups with those of MC children (see Table 10 in Appendix 4). Among MC KG children there was a marked decrease in the percent who were able to answer all of the content questions (from 50% to 30% while among the KG LC there was no similar decrease. In G-2 there was an increase in the program's comprehension by the LC but a decrease among the MC. There were similar differences in G-3.

Examining the overall results of viewing, enjoyment and comprehension it becomes evident that MC children adjusted faster to the program's requirements than LC children. The former viewed more, enjoyed more and comprehended more. However, as the season progressed the pattern changed. MC children became less systematic viewers (hence the drop in their comprehension scores), and enjoyed the program less and less. This shift is particularly evident in MC G-2 and G-3 children. It appears that as these children adjusted to the novel formats of the program, its content ceased to interest them. They seem to have discovered that the content was too childish for them.[6] Hence the decline in their viewing and enjoyment. LC

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[6] This should come as no surprise. After all, a middle class 8 year old could not continue to be excited about a program which teaches him elementary material he had mastered three or four years earlier.

children, in contrast, had a longer period of adjustment. Once adjusted, they became systematic viewers, enjoyed the program and comprehended it relatively well.

2. Attention to the Program's Segments

a. Changes Over Time

As stated previously, changes in children's attention to show segments were recorded by personal observations. Six children were chosen from each age and social class group and were invited to watch the program in groups of six on four occasions during the season. The observers recorded the children's behavior on every single minute of each show, and noted three mutually exclusive behaviors: attention, active-participation, or inattention.

Inattentive behavior constituted a relatively large proportion of time in the beginning of the broadcasting season (23.9% of the time on the first observation more than half the children were inattentive; see Table 8). As the season progressed inattention gave way to active-participation. This shift came as no surprise, since no active participation could take place in stimuli which were too novel and not sufficiently understood. With increased exposure, familiarity increased and viewing of the program became more active. Table 8 shows the percent of minutes in each of the four observations where more than half the children displayed active participation or inattention.

Table 8: Percent of Minutes of Each Show in Which More than Half the Children Displayed Active-Participation or Inattention

1st Observation		2nd Observation		3rd Observation		4th Observation	
Active Participation	Inattention	Active Participation	Inattention	Active Participation	Inattention	Active Participation	Inattention
10.35%	23.9%	15.4%	13.7%	16.8%	9.8%	18.5%	9%

As can be seen, the percent of minutes in which more than half the children displayed inattention decreased from 24% to 9% while the percent of minutes in which more than half the children participated actively in the show rose from 10.3% to 18.5%

A detailed analysis by age and social class (Table 9) reveals that drops in inattention in the KG age group were more pronounced among MC than among LC children. In the latter group, the changes were less stable and more haphazard. Changes in active participation revealed the opposite pattern. LC increased their active participation more steadily than MC. In G-2 the patterns of both LC and MC are quite similar. However the most striking difference in attention patterns is found among G-3 children. Both MC G-3 as well as LC children displayed a drop in inattention, but it is more pronounced among the LC, while most moderate among the MC. Even more important are the changes in active-participation: among LC G-3 children there

was a steady and dramatic rise in active-participation, while there was a dramatic decrease in active-participation among the MC. Apparently MC G-3 children revealed a behavior that can be explained as loss of involvement in the program already in the first half of the broadcasting season, while LC G-3 children continued to be involved more actively.

Table 9: Attention on Four Observations by Age and Social-Class (in percent of minutes of each show)

	1st Observation		2nd Observation		3rd Observation		4th Observation	
	Active Participation	Inattention	Active Participation	Inattention	Active Participation	Inattention	Active Participation	Inattention
LC KG	10.6	23.3	12.0	19.5	12.5	23.4	21.8	9.0
MC KG	1.7	46.5	19.1	24.4	5.7	17.3	18.7	8.3
LC G-2	5.0	21.2	9.7	2.3	15.7	18.0	23.5	6.8
MC G-2	13.1	16.5	10.3	23.9	17.0	19.0	27.0	21.0
LC G-3	11.4	29.6	20.9	5.9	32.1	5.9	42.0	5.0
MC G-3	20.5	9.3	20.4	6.4	18.2	5.5	8.4	4.0

It seems from these comparisons that there were two opposing trends: lower SES children at all ages increased their active-participation in the program, while the MC, 8-9 year old displayed a growing loss of involvement in it, at least as displayed by their active-participation in its segments. Yet the loss of involvement was not matched by growing inattention.

This confirms our conclusions as presented in our discussion of the differences in viewing, enjoyment and comprehension.

b. Interesting and Boring Segments

Only segments to which more than 50% of the children reacted inattentively or with active-participation on more than two occasions were considered as "boring" or "interesting." For example, a segment was presented six times during the 12 broadcasts in which we observed the children. If at least two presentations of this segment produced inattention among more than 50% of the viewers, it was identified as "boring," and as "interesting" if it produced active-participation. In such a way the following 11 segments were singled out: songs, geometric forms, letter sounds, stories, Jenny's drawings, films, the numbers 1-10, single numbers, Solomon Grundy, Ernie and Bert, Bud and Jim.

In Table 10, we present the number of times each of these segments was shown in the program sample we investigated, and the percent of times it produced in more than 50% of the children inattention or active-participation. In order to assure that this analysis was reliable, all 12 broadcasts (observed at four different times) were randomly divided into two halves. The computations were first done on the first half and then on the second one. If significant differences, in terms of active-participation or inattention which a segment produced, were found between the two halves - we would have had

to take that segment out since its effect was not systematic. On the other hand, if there was no difference between the two halves - it could be claimed that the segment had a systematic effect. For this reason χ^2 values were computed for every comparison, thus turning it into a hypothesis testing procedure. In all the comparisons, χ^2 values were very low or insignificant, thus indicating that our identification of "interesting" and "boring" segments was sufficiently reliable. (Table 10, see Page 50).

From this analysis it can be learned that the number of segments which systematically prodcued inattention was greater than the number of segments which produced systematic active-participation.

What are the criteria by means of which "interesting" segments differ from "boring" ones? First, let us examine the factor of repetition. It seems that the frequency of repetition has no relationship to inattention. The Spearman Rank-Order Correlation between the number of times a segment was presented during the season and the percent of times it produced inattention is .10, a low and insignificant correlation. In contrast - there seems to be a negative correlation between the number of times a segment is presented and the percent of times it produces active-participation. The Rank-Order Correlation between the two is -.50 (not significant). One should be cautious in drawing quick generalizations from this since the segment sample was rather small (11 segments). It can only be said that there is

Table 10: A Description of the Segments Which Aroused Inattention or Active-Participation on More than Two Occasions

The Segment	No. of times Presented	No. of times inattention took place in more than half the children	No. of times active participation took place in more than half the children
Songs	42	13 (31%)	2 (5%)
Geometric Forms	18	7 (38%)	2 (11%)
Letter Sounds	82	11 (13%)	7 (8%)
Stories	8	6 (75%)	2 (25%)
Jenny's Drawings	10	7 (70%)	0
Films	36	14 (39%)	7 (19%)
Single Numbers	50	11 (22%)	5 (10%)
Numbers 1-10	34	0	5 (15%)
Solomon Grundy	4	0	4 (100%)
Ernie & Bert	26	0	14 (54%)
Bud & Jim	26	0	13 (50%)

no clear relationship between the number of times a segment is presented and the amount of interest or boredom it produces, although there is the possibility that less frequently shown segments produce more involvement.

A more detailed investigation of the "interesting" and the "boring" segments dispelled the fear that the real factor of differentiation was the quality of the Hebrew translation. There were segments which were translated adequately (films) but produced inattention, while other segments, equally well translated, produced much active-participation (for example, Ernie and Bert), and vice versa. It is also difficult to claim that the differentiating factor was previous familiarity with the content. There were some segments whose content was not new yet they were boring (geometric figures) or interesting (numbers 1-10), and there were other segments whose content was new to the child and they were boring (letters) or interesting (Ernie and Bert).

It seems that the main differentiating factor was the method of presentation: Segments which contained a direct didactic (instructional) element increased inattention. This is true for all of the discussed segments except for the Songs segments which were boring although not direct instruction. For these segments, and these alone, it is possible to say that they caused boredom since they were completely unknown to the children.

It is possible to differentiate between the "boring" and "interesting" segments by means of an additional criterion, namely: the independence of the visual aspect of the segment. Whenever the critical part of the information was in the sound-track, there was much more inattention than when the critical part of the information was visual. Similarly, when the critical information was visual, there was more active-participation than in segments in which the critical information was verbal. This should be seen from the viewing child's point of view. He could extract meaningful information (whether it was the information the producer had in mind or not) from the segments he saw such as Bud and Jim's, Ernie's and Bert's, Solomon Grundy's, and the numbers from 1 to 10, without having to follow the verbal talk on the sound-track. On the other hand, almost all of the segments which were characterized as "boring" had little visual variability while most of the information to be extracted was part of the verbal explanation. The one exception was the Letter Sounds segments, where there was much visual variability and yet - inattention. Indeed, of all of the "boring" segments, this was the one in which the percent of inattention was the lowest.

3. The Program's Effect on Children: The Field Study

As mentioned earlier, the main purpose of the study was to examine the interrelationships between exposure to the program and the changes that occur in the children's skills and knowledge.

More specifically, we wanted to investigate the effects that exposure had on achievements in the intended goal areas of the program, as well as on skills which we hypothesized to be related to media-literacy - skills which could be affected by the presentation formats of the program.

The tests for kindergartens stressed especially the former area and only two tests pertaining to media-literacy were included in the battery. In contrast, in our examination of school children we stressed especially the media-literacy area and included only two tests of the intended goal areas. All in all, there were three identical tests for KG and school children: Classification, Parts of the Whole, and Field Independence. Within the KG investigation, we manipulated an additional independent variable, namely encouraging mothers to watch the program with their children. Half the KG children (including LC and MC) were assigned to the mother-encouraged condition.

a. A Note on Data Analysis

Analysis of the data presented a number of difficulties which were discussed in the chapter on research design. As mentioned earlier, we chose to analyze the data by the method of multiple regression (with forced order of variables) through which we were able to isolate, or partial-out the contribution of the background, initial achievement and skill variables to the variance of any one of the dependent variables. Once the contribution of all the background, initial achievement and skill variables was partialled out, it became possible to examine

the additional or "net" contribution of exposure to the program to the variance of any chosen dependent variable. This method is preferred to the comparison of pre- and posttest mean scores. Firstly, difference scores are known for their doubtful reliability (Cronbach & Furby, 1970). Secondly, it is possible to expect changes in test scores to take place from one occasion to another five months later that are not related to exposure to the program. On the other hand, we were only interested in those changes which could be attributed, statistically, to the main independent variable of the study: exposure to the program.

We also compared within each age group the 25% of the children who watched the program the most (the upper viewing quartile, Q4) with the 25% of the children who watched the least (the lower viewing quartile, Q1). It is obvious that these two groups are not similar to each other - neither at the beginning of the season nor at the end of it. It is to be expected that children who choose to be heavy viewers of the program will be different in many respects from children who do not view it. Therefore, we chose to use the method of multiple regression in order to isolate the influences of the background, initial achievements and skills, and compute the respective predicted posttest means as functions of the amount of exposure to the program.

One has to be cautious in interpreting the findings based on stepwise regression analyses. The "net" amount of variance in any given dependent variable which is exclusively

accounted for by amount of exposure, depends to an extent on the amount of variance which is partialled out due to background, initial achievement and skill variables. Therefore, there is much more meaning to the relative contributions to the variance when groups are compared, and less so to the absolute contributions. If, for example, we find that exposure to the program contributes in group 'a' to 20% of the variance of a given final test, while in group 'b' the comparable contribution reaches only 8%, then we can see who was more and was less "affected" by exposure to the program.

The absolute percent of accounted for variance in each one of the groups is contigent upon the amount of variance isolated previously. This amount is influenced by the number of background and achievement variables analyzed by the various steps of the multiple regression. If some variables were excluded the overall variance accounted for would be smaller, whereas if some variables were added the overall variance accounted for could be greater.

A second point to be remembered when interpreting the findings is that "effect" here means the amount of variance of any posttest that can be accounted for by the differences in exposure to the program. We are not dealing here with the number of achievement-points the children scored as a result of viewing the program but with the strength of the relationship between exposure and posttest achievement. Larger portions of posttest variance which are attributable to exposure (other

things made statistically to be part equal) are interpreted as indicating stronger effects of exposure to the program.

Exposure to the program was measured by four measures. Three of them were used on six occasions during the broadcasting season: the amount of viewing of the program, the amount of its enjoyment, and content comprehension the day after a show was aired. The fourth measure was a test (Sesame -Street Test) that was administered at the end of the season with all the other posttests. Each one of these measures could contribute to the variance of a posttest. These contributions are partially overlapping. Therefore we can combine the non-overlapping contributions of these four measures to the variance of each posttest. But this kind of combination is allowed, or possible, only when there are intercorrelations among the four measures.

Table II shows the intercorrelations between the four exposure meaures separately for each of the groups in the field-study. (See Page 58).

The correlations with the Sesame-Street test scores were rather important to us. In most of the groups and sub-groups there were significant correlations between comprehension of the program's content the day after its broadcast and scores on the Sesame-Street test. Only G-3 classes were an exception to this. In general, the correlations in KG were higher than the correlations in the grade school sample. They were especially high among LC KG children and especially low in G-3.

On the basis of these correlations we reached the conclusion that the non-overlapping contributions of the exposure measures could be combined in the kindergartens but not in the grade school sample.

Table 11: Intercorrelations Among the Four Exposure Measures in the Various Sub-Groups of the Field Study.

	Viewing	Enjoyment	Comprehension	Sesame Street Test
KG: General (n=93)				
1. Viewing	-	.105	.265*	.230*
2. Enjoyment	-	-	.479**	.419**
3. Comprehension	-	-	-	.617**
KG: Children without Encouragement (n=44)				
1. Viewing	-	.640**	.622**	.399**
2. Enjoyment	-	-	.470**	.362*
3. Comprehension	-	-	-	.560**
KG: Encouraged group (n=49)				
1. Viewing	-	.016	.200	.345*
2. Enjoyment	-	-	.345*	.225
3. Comprehension	-	-	-	.244
KG: Low SES (n=50)				
1. Viewing	-	.667**	.473**	.468**
2. Enjoyment	-	-	.516**	.432**
3. Comprehension	-	-	-	.599**
KG: Middle Class (n=43)				
1. Viewing	-	-.069	.294*	.110
2. Enjoyment	-	-	.282	.238
3. Comprehension	-	-	-	.471**
School: General (n=224)				
1. Viewing	-	.655**	.227**	.062
2. Enjoyment	-	-	.392**	.012
3. Comprehension	-	-	-	.179*

*$P < .05$ **$P < .01$

Table 11 (cont'd.)

	Viewing	Enjoyment	Comprehension	Sesame Street Test
School: G-2 (n=106)				
1. Viewing	-	.685**	.156	.041
2. Enjoyment	-	-	.343**	.078
3. Comprehension	-	-	-	.352**
School: G-3 (n=118)				
1. Viewing	-	.623**	.342**	.081
2. Enjoyment	-	-	.482**	-.053
3. Comprehension	-	-	-	-.049
School: Low SES (n=94)				
1. Viewing	-	.836**	.271**	.307**
2. Enjoyment	-	-	.289**	.199
3. Comprehension	-	-	-	.322**
School: Middle Class (n=130)				
1. Viewing	-	.396**	.053	-.075
2. Enjoyment	-	-	.038	.057
3. Comprehension	-	-	-	.411**

*$p < .05$

**$p < .01$

b. The Effects of Exposure to the Program on KG Children

The mean pretest and posttest scores of the LC and the MC KG children are presented in Table 12. As it can be seen, there are substantial initial differences between the two groups (all differences are statistically significant, $P < .05$) in favor of the MC group. Similar differences can be found in the posttests.

Table 12: Mean Pretest and Posttest Scores of LC and MC Kindergarten Children

	Pretest				Posttest			
	Low SES (N=55)		Middle Class (N=48)		Low SES (N=50)		Middle Class (N=43)	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Letter Matching	3.04	1.11	3.81	1.05	4.76	2.19	5.27	2.20
Picture-Number Matching	8.98	1.75	10.76	0.98	10.53	2.15	11.23	2.65
Number Matching	2.94	1.19	7.36	1.18	4.07	1.32	8.04	1.98
Field-Independence	3.35	1.77	5.03	1.75	5.58	1.95	6.74	1.42
Parts of the Whole	4.00	2.33	6.12	2.04	5.91	2.23	7.42	3.27
Relational Concepts	4.27	1.33	5.71	0.93	5.43	1.40	6.37	1.04
Classification	6.64	3.98	10.16	3.44	8.81	4.44	13.66	2.72
Ordering of Pictures	0.84	0.95	1.81	1.02	2.07	1.39	1.81	0.79
Sesame Street Test	-	-	-	-	3.33	2.94	7.09	3.50

(1) Did the Program Have an Effect on the Children's Achievement?

In order to examine the effects that exposure to the program had on posttest scores, all KG children were first divided into four viewing quartiles. The effects of background and initial (pretest) achievement were isolated and for each one of the two extreme quartiles - heavy and light viewers - predicted means (i.e., the means expected on the basis of the regression equation) of achievement scores were computed. These are presented in Table 13.

Table 13: Predicted Posttest Means for the Two Extreme Viewing Quartiles

The Test	Predicted Means of Lower Viewing Quartile (N=23)	Predicted Means of Upper Viewing Quartile (N=23)	R^2	Sy.x	Contribution of Exposure F	P
Letter Matching	1.43	14.68	.488	1.64	11.09	$<.01$
Number Matching	1.55	8.60	.406	1.32	5.43	$<.05$
Picture-Number Matching	12.68	14.94	.572	0.79	1.60	-
Field Independence	4.81	5.33	.352	1.24	0.22	-
Parts of the Whole	2.12	14.84	.306	2.56	6.26	$<.05$
Relational Concepts	6.76	7.01	.397	1.01	0.06	-
Classification	5.09	22.04	.735	2.45	9.86	$<.01$
Picture Ordering	1.26	- 0.53	.549	0.75	1.31	-

It can be seen from the table that after background, initial achievement and skill scores were partialled out, heavy viewers (Q4) outperformed light viewers (Q1) on nearly all posttests. This is to say that when the two groups are statistically made equal and only amount of viewing left to differentiate between them, there appear differences between the predicted mean posttest scores of the two quartiles. These differences are significant in four out of the eight tests.

This comparison, revealing as it may be, excludes, in fact, half the children. Analysis of the contribution of exposure to the program to posttest performance when all of the KG children are considered is presented in Table 14. This table presents the posttest variance accounted for by background and pretest scores (first three columns) as well as their total contribution when added up (fourth column). After the contribution of these factors has been partialled out, exposure was entered and its additional contribution to the posttest variance was tested for significance. (Table 14, see Page 63).

The overall analysis, based on all of the children, yields a picture similar to that which was pro[illegible] by the comparison of weighted means. But the present analysis provides more detail.

Table 14: Amount of Posttest Variance Accounted for by Background, Initial Achievement and Exposure for All KG Children (N=93)

Variance accounted for, on . . . / Source	SES $+R^2$	Other background variables $+R^2$	All pretests $+R^2$	Total R^2	Contribution of Exposure $+R^2$	F	P
Viewing	4.6%	49.0%	5.0%	58.6%			
Enjoyment	6.3	18.9	17.3	42.5			
Comprehension	13.4	17.3	16.6	47.3			
Sesame Street Test	24.6	7.2	12.7	44.5			
Matching of Letters	0	2.7	19.2	21.9	5.2%	4.71%	$<.05$
Matching of Numbers	8.7	13.2	12.6	34.5	11.8	14.26	$<.01$
Picture-Number Matching	13.2	6.6	22.7	42.5	7.8	9.84	$<.01$
Field Independence	3.2	3.2	15.5	21.9	4.0	3.64	$<.05$
Parts of the Whole	0.7	8.8	11.8	20.3	13.3	7.12	$<.01$
Rational Concepts	11.3	11.1	17.2	39.6	3.8	4.53	$<.05$
Classification	24.7	4.7	24.3	53.7	8.4	12.95	$<.01$
Picture Ordering	35.9	7.1	8.8	51.8	1.4	2.45	-

It can be seen that exposure accounted for significant portions of posttest variance in all the intended goal areas. The biggest contribution that exposure had was to the test of Parts of the Whole and to Matching Numbers. In contrast, we do not find that exposure to the program contributed significantly to performance on the test of Picture Ordering. Exposure to the program had some contribution to the variance of the Field Independence test, but was not found to be significant at the required level. As previously stated, these two latter tests were supposed to measure components of the children's media-literacy. The absence of effect on performance on these two tests evidently shows that exposure to the program, even though it was psychologically demanding, did not change the skills which he hypothesized to be affected by the presentation formats of the medium.

(2) Who Was More and Who Was Less Affected? In Which Areas?

The socio-economic background of the children, other background factors, and especially the initial achievement scores had large effects on posttest achievement scores, as can be seen in Table 14. Therefore, it was found necessary to separate between LC and MC children in order to measure the contribution that exposure to the program had on each of the groups. Table 15 presents the multiple regression analyses of the data on MC (N=43) and LC children (N=50) separately. (Table 15, see Page 65).

Table 15: Amount of Posttest Variance Accounted for by Background, Initial Achievement and Exposure for Each SES Group at KG Age

Variance Accounted for on . . .	Source of Variance	All background variables R^2	All Pretests $+R^2$	Total R^2	Contribution of Exposure $+R^2$	Exposure F
Viewing	MC	22.4%	26.4%	48.8%		
	LC	37.4	26.1	63.5		
Enjoyment	MC	17.3	52.7	70.0		
	LC	26.0	23.2	49.2		
Comprehension	MC	29.0	45.9	74.9		
	LC	37.6	28.3	65.9		
Sesame Street	MC	12.6	48.9	61.5		
	LC	20.2	25.7	45.9		
Letter Matching	MC	14.8	36.0	50.8	4.3%	1.96
	LC	26.7	21.1	47.8	16.3	5.40*
Number Matching	MC	38.2	16.6	54.8	11.0	4.50*
	LC	25.2	31.3	56.5	17.8	7.30*
Picture-Number Matching	MC	14.1	46.8	60.9	10.1	4.76*
	LC	16.8	45.2	62.0	14.0	5.20*
Field Independence	MC	3.7	28.4	32.1	9.6	3.75
	LC	15.3	28.5	44.8	5.1	2.20
Parts of the Whole	MC	19.0	17.8	36.8	18.3	6.90*
	LC	20.9	27.6	48.5	6.6	3.60
Relational Concepts	MC	16.1	39.1	55.2	4.2	2.10
	LC	16.9	26.4	43.3	17.7	8.10*
Classification	MC	30.1	24.3	54.4	14.3	6.90*
	LC	8.2	52.3	60.5	9.2	4.80*
Picture Ordering	MC	29.1	28.9	58.0	7.4	3.40
	LC	14.0	27.3	41.3	5.3	2.10

* $p < .05$

Comparing the contributions of exposure to posttest performance of the MC and the LC groups, we find that in the tests of Letter Matching, Number Matching, Picture-Number Matching, and Relational Concepts, exposure to the program accounted for more of the posttest variance among the LC. The opposite is the case in the tests of Parts of the Whole and in Classification, where exposure to the program accounted for a larger portion of the variance among the MC. This finding is somewhat surprising since it is rarely the case that, other factors held constant, LC children benefit more than MC ones (Katzman, 1973).

Examination of the mean scores and the respective standard deviations makes the possibility of a ceiling effect unlikely. That is, the possibility that MC children received too high scores to allow for further improvements was ruled unlikely. Thus, for example, the mean posttest score of the MC group was 5.27 (SD: 2.20) on the test of Letter Matching, while the maximum could be a score of 8; their mean Number Matching score was 8.04 (SC: 1.98) out of a possible score of 11; and a mean score of 6.37 (SD: 1.04) on the test of Relational Concepts, out of a possible score of 8.

It is thus intriguing to ask whether there might be a profound difference between the goal areas in which the LC group was more affected as compared with the areas in which the MC group was more affected. In other words, are there some underlying psychological differences between the tests of Parts of the Whole and Classification on which MC profited more and the other tests on which LC gained more?

A somewhat intuitive examination of the tests suggests that the different tests of Matching, as well as the test of Relational Concepts, require an <u>analytic</u> approach, calling for differentiation and (partly, at least) visual discrimination. On the other hand, the tests of Parts of the Whole and Classification appear to require an approach of <u>synthesis</u>, that is, combining elements and abstracting a new entity on the basis of the new combination.

If indeed these are the factors differentiating between the two types of tests, then on the basis of a taxomonic-hierarchical view of skills (Bloom, 1956; Kropp and Stoker, 1966) we could hypothesize that improvements in the area of synthesis need to be contingent upon <u>prior</u> achievements in the area of analysis. It follows that children who have reached an initial mastery of analytic skills should be able to improve in the area of synthesis. On the other hand, children with initially poor mastery of analytic skills should improve first in the area of analysis. Thus, we would expect early achievements on tests which require analysis to predict later achievements on tests

of synthesis but not vice versa, i.e., early achievements in synthesis should not predict later performance on analytic tests.

This hypothesis can be tested by means of the crossed-lagged correlation panel. Pre- and posttest achievements on both types of tests are intercorrelated and the magnitude of these correlations is then examined. (See Figure 1, Page 69). The tests of Classification and Parts of the Whole were considered to represent the area of synthesis while the other tests were considered as tests of analytic and discrimination ability.

Examination of the correlations on the diagonals makes it evident that prediction from early mastery of analytic skills to later mastery of synthesis is far better than prediction in the opposite direction. For instance, pretest scores on the Number Matching test (assumed to be a test of visual analysis) correlated .41 ($P<.01$) with Classification posttest scores. However, pretest Classification scores correlated only -.02 with Number Matching posttest scores. Thus we seem to have evidence to support claims that (a) the tests pertain apparently to two classes of abilities, possibly - analysis and synthesis, and (b) mastery in the area of synthesis is contingent upon <u>prior</u> mastery in the area of analysis.

Figure 1: Crossed-Lagged Correlation Panel of Pre- and Posttests of Analysis and Synthesis (N=93)

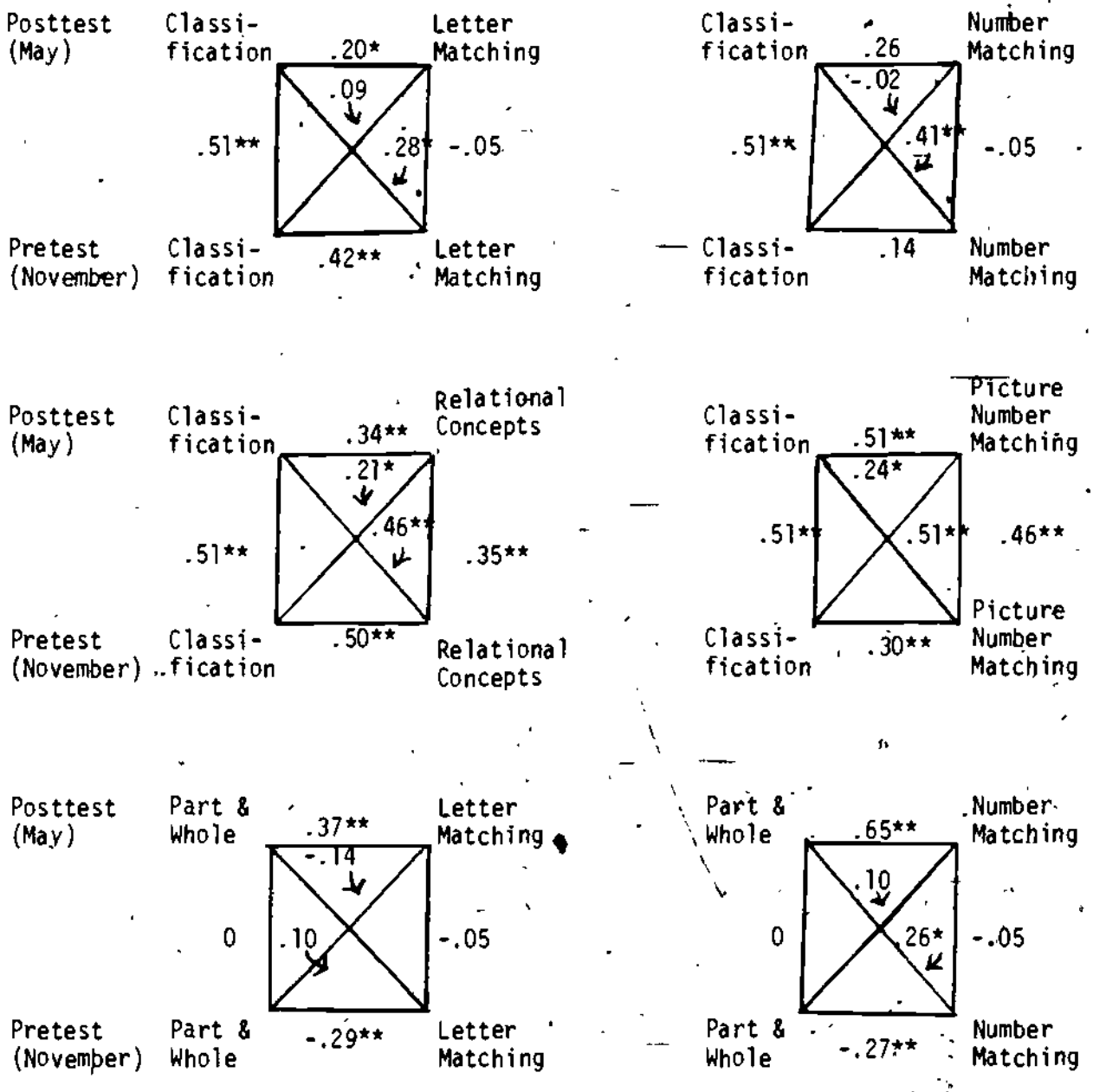
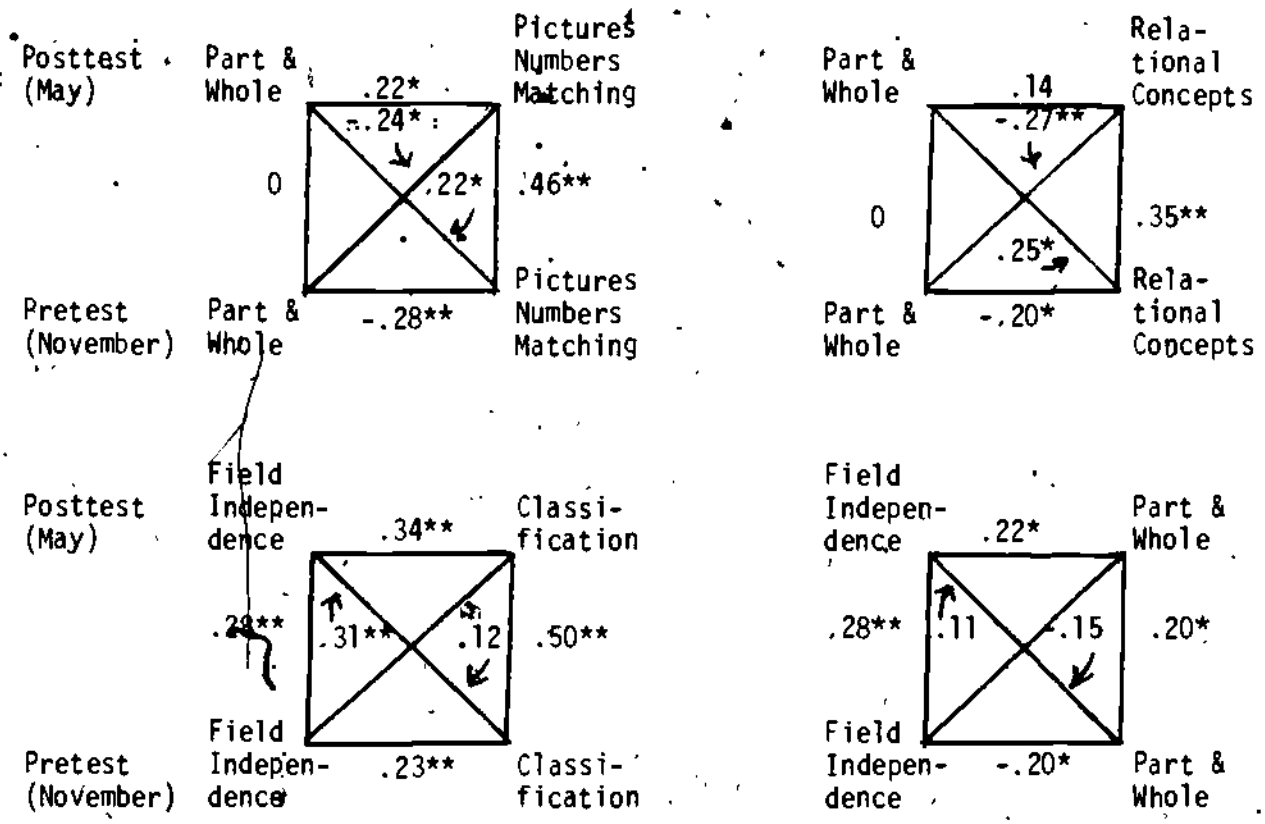


Figure 1 (cont'd.)



* $P < .05$

** $P < .01$

In light of the above one can better understand why LC children, whose initial mastery was relatively low on all tests (Table 1), benefited more in one area while MC children profited more in another. Since MC children have started out with a relatively high level of mastery in the analytic area, they could be affected by the program in the area of synthesis. LC children, on the other hand, needed to improve in their analytic abilities before exposure to the program could improve their abilities of synthesis.

It is reasonable to conclude that exposure to Sesame Street had differential effects. Each child gained from the program in an area in which his deficiency (i.e., relatively poor mastery) was more basic. Hence the stronger effect on LC children in areas measured by the tests of Matching and the test of Relational Concepts, and the stronger effect on MC children in areas measured by the tests of Classification and Parts of the Whole.

(3) The Effect of Encouraging the Mothers

As previously stated, the KG children were divided into two groups: one group of children (two kindergartens: one of lower class children and one of middle class children) whose mothers were encouraged to co-observe the program with their children, and a second group (identically composed) - whose mothers were not encouraged, thus watching the program as they pleased.

It was hypothesized that children whose mothers were co-observing the program with them would not only watch the program more but would also benefit more from it. Table 16 presents the amount of posttest variance accounted for by encouragement of mothers after partialling out the effect of background variables and initial achievements, separately for MC and LC children.

As hypothesized, encouragement of mothers contributed to the amount of exposure to the program, but this contribution was only significant in the LC group (8.6%). In the MC group it was very small. Similarly, encouragement of mothers contributed impressively to the enjoyment of the LC children (23.6%) and somewhat less to their comprehension of the program's content (6.1%), but not to the enjoyment and comprehension of the MC children. For them, exposure to the program, enjoyment from it and comprehension of its content were not affected by the encouragement given to their mothers.

Aside from the effect of encouragement on the exposure patterns of LC, one should notice the nearly total absence of any posttest variance accounted for directly by mothers' encouragement. The only exception is Field Independence, where encouragement made a significant difference for MC but not for LC children. (Table 16, see Page 73).

If encouragement did not have a direct effect on learning beyond its effects on the amount the LC children were exposed to the program, it had an indirect effect on them inasmuch as it made their social class affiliation become less significant a predictor, as shown in Table 17 (see Page 74).

Table 16: Amounts of Posttest Variance Accounted for by Mother's Encouragement After Controlling for Background and Initial Achievement Variables

Variance accounted for on . . .	Total Group[1] (N=93)		Among Middle Class[2] (N=43)		Among Low SES[3] (N=50)	
	R^2	F	R^2	F	R^2	F
Viewing	2.6%	3.04	3.5%	1.63	8.6%	8.92**
Enjoyment	7.0	9.63	0.3	0.22	23.6	25.20**
Comprehension	3.4	4.95*	0.4	0.32	6.1	6.28*
Sesame Street Test	6.2	9.50**	2.7	1.65	6.3	3.68
Letter Matching	4.2	4.20*	7.7	3.72	0.9	0.61
Number Matching	1.1	1.46	0.1	0.03	0.2	0.17
Picture-Number Matching	0.1	0.18	1.8	0.90	0.8	0.96
Field Independence	9.1	9.40**	13.0	5.17*	5.7	3.25
Parts of the Whole	0	0	0	0	5.4	3.42
Relational Concepts	2.2	2.74	1.9	0.88	0	0
Classification	0.5	0.86	0	0	2.1	1.85
Picture Ordering	1.7	2.62	0.1	0.04	0.2	0.10

* $P < .05$

** $P < .01$

1 All encouraged children in comparison with all not-encouraged ones.

2 Comparison between the MC encouraged and MC not-encouraged.

3 Comparison between LC encouraged and LC not-encouraged.

Table 17: Amounts of Exposure and Posttest Variance Accounted for by SES Differences in the Encouraged and Not-Encouraged Groups

	Encouraged Group (N=50)		Not-Encouraged Group (N=43)	
	R^2	F	R^2	F
Viewing	4.5%	2.21	27.6%	16.00**
Enjoyment	0.8	0.37	19.4	10.12**
Comprehension	5.5	2.72	31.2	19.01**
Sesame Street Test	31.2	21.30**	25.7	14.53**
Letter Matching	4.3	2.12	12.6	6.06*
Number Matching	12.9	6.65	6.5	2.95
Picture-Number Matching	0.9	0.45	34.0	21.65**
Field Independence	21.7	13.04**	0.2	0.06
Parts of the Whole	3.6	1.78	0.1	0.02
Relational Concepts	5.6	2.80	19.8	10.36**
Classification	16.5	9.29**	36.5	24.19**
Picture Ordering	28.7	18.97**	44.0	33.02**

* $P < .05$

** $P < .01$

Examination of the amounts of posttest variances accounted for by SES differences in the encouraged and not-encouraged groups shows a differential pattern. While SES accounted for relatively large portions of posttest variance in the not-encouraged group, it accounted for far less variance in the encouraged group. Thus, e.g., whereas SES differences accounted for 36.5% of the Classification test variance in the not-encouraged group, it accounted for only 16.5% in the encouraged group. The same pattern can be seen in most other tests. The only exception is the Field Independence Test, where encouragement accentuated SES differences in favor of the middle class. This had been noted in Table 16, and will be discussed later.

With respect to most of the posttest measures, one finds that encouraging mothers attenuates rather strikingly the predictive power of SES. It appears as if the psychological correlates of SES differences become either completely irrelevant or at least far less relevant when mothers are encouraged to co-observe the program with their children.

Generally, then, the encouragement of mothers had a relatively strong but indirect effect on the learning of the LC, but not the MC group. This effect was mediated by the modes of exposure to the program. Encouraged LC children viewed more of the program and knew more of its messages. However, the component of exposure which was most strongly and directly affected by mothers' encouragement was the children's enjoyment of the program. Indeed, enjoyment was a significant contributor

to learning in the LC, but not in the MC group. While enjoyment correlated non-significantly with posttest measures in the MC group (median r = .15; range from -.09 to .29), it correlated much higher in the LC group (median r = .36; range from .20 to .66). Moreover, whereas enjoyment correlated only moderately with the other measures in the not-encouraged LC group (median r = .28), it correlated far higher in the encouraged LC group (median r = .48). Within the MC group no such differences were found. It is warranted to conclude that while enjoyment makes little difference for MC children, it is of much importance to LC ones.

It seems, then, that the encouragement of mothers had mainly an affective influence, which was negligible in the MC group but very functional for the LC children. For them, apparently, enjoyment, hence positive affect, may be very conducive for benefiting from a program such as Sesame Street. It makes them benefit nearly as much, and sometimes more, than MC children. This finding is in keeping with Berlyne's (1969) finding concerning the increased pleasantness of a stimulus with the decrease in its ambiguity or complexity.

Yet, there is the question as to why only LC children benefited from mothers co-observing in terms of increased enjoyment and comprehension of the show while MC children did not. A possible answer, though one for which no direct evidence is available, is that MC children watch television with their mothers quite frequently anyway and hence no change of situation

and social atmosphere was experienced by them when mothers complied with our request. Indeed, their mean viewing, enjoyment and comprehension scores were significantly higher than those of the LC children, even without the addition of co-observing mothers. But this could not account for the fact that their Field Independence scores (unlike those of LC) were directly affected by the co-observation of mothers.

We may, however, safely assume that the encouraged mothers of all children were active co-observers and aided the children to structure the messages and attend to particular elements in the program. This was, quite likely, redundant for the MC but not for the LC children with regard to all measures but Field Independence. Here, the mothers' behavior of singling out specific elements in the program may have provided unplanned for, incidental training which may have manifested itself in the children's performance on a test which measured a similar capability. Since this test measures a cognitive style rather than a particular and more easily modifiable skill, it would be possible to hypothesize that it is the initially less field dependent child, observing a program with a more analytically oriented mother, who benefits more from her paticipation in this area.

(4) Summary

The first question we wanted to answer was: does exposure to the program affect the kindergarten children's achievements?

Comparison of the posttest scores of heavy viewers (the upper viewing quartile) with the scores of light viewers (the lower viewing quartile), after partialling out the background variables and initial achievements, reveals that the program had a substantial effect on four out of the eight areas investigated. A more detailed investigation based on all of the KG children reveals that exposure to the program had a significant contribution to the variance of six out of the eight tests. All of the areas which were affected by exposure to the program were from amongst the original goal areas. On the other hand, the measures which we subsumed under media-literacy (Picture Ordering Test and Field Independence) were not at all affected.

The second question we asked was who was more affected by exposure to the program, and in which areas? Our analyses indicated that SES was a strong predictor. Indeed, examination of the LC and the MC groups indicated that the program had differential effects. LC were affected more in those areas which seemed to require an analytic approach to stimuli, while the MC children were more affected in those areas which we think require more an approach of synthesis. In order to test this hypothesis, we examined the possibility that early achievements on analytic tests condition later achievements in tests which require, apparently, an approach of synthesis, but not the reverse. On the basis of correlational analyses, the hypothesis was confirmed: achievements on tests such as Letter Matching, Number Matching, and Relational Concepts (assumed to

be analytical) adequately predicted posttest achievements on the tests of Classification and Parts of the Whole (assumed to require skills of synthesis). We did not find high correlations in the opposite direction. Hence, we concluded that the suggested differentiation between the two types of tests was reasonably valid. It was consequently concluded that LC children benefited more in the analytic area, since mastery of it is prior condition to improvement in the area of synthesis. MC children profited more in the area of synthesis, since their initial mastery of analysis was sufficient to allow improvement in synthesis.

The third question we presented was concerned with the effect on the amount of learning from the program of encouraging mothers to co-observe the program with their children. Encouragement of mothers was not found to affect the amount of viewing done by the MC children but did affect the amount of exposure of the LC children. The effect on the children's enjoyment from the program was especially salient. Excouragement of mothers did not have a <u>direct</u> effect on achievements, except on Field Independence, in which mainly MC children were affected. On the other hand, we found that encouragement of mothers had an <u>indirect</u> effect on achievements, inasmuch as it substantially reduced the predictive or differentiating power of SES differences. The ever-present differences between the LC and the MC children were dramatically attenuated in the encouraged group. The gap between these two groups remained a

strong predictor in the group of children who watched voluntarily, without mothers' encouragement.

c. The Effects of the Program on Grade-School Children

The mean pretest achievement scores of LC and MC school children are presented in Table 18. It should be noted that the school children's scores are not necessarily higher (in two cases they are even lower) than the scores of the KG children, when compared on the identical tests. However, the different testing conditions may account for this anomaly: while the KG children were tested individually, the grade-school children were tested in groups.

Table 18: Mean Pretest and Posttest Scores of LC and MC School Children

	PRETEST				POSTTEST			
	Low SES (N=82)		Middle Class (N=142)		Low SES (N=82)		Middle Class (N=142)	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Parts of the Whole	7.43	2.10	7.60	1.88	8.18	1.94	8.45	1.60
Classification	7.54	2.96	7.73	2.73	9.91	2.76	10.95	2.79
Field Independence	5.15	1.48	5.46	1.30	2.30	1.56	6.67	1.35
Ordering of Pictures	0.79	0.84	1.13	0.80	1.30	1.05	1.72	1.13
Points of View	1.21	0.90	1.48	0.84	1.34	0.87	1.90	0.92
Figure & Ground	1.62	1.32	2.41	1.26	2.70	1.41	3.06	1.59
Close-up - Long Shot	3.13	0.94	2.78	1.78	3.60	1.31	4.16	1.15
Sesame Street	-	-	-	-	6.87	3.41	8.85	3.34

As seen in Table 18, the MC children score somewhat higher on the pretest than the LC children, although the differences are not significant except for two tests: Ordering of Pictures and Figure and Ground. But these differences, although significant, are quite small. There are somewhat larger differences between the LC and MC scores in the posttests, a point to which we will return later on.

(1) Did the Program Have an Effect on the Children's Achievements and Skills?

All tests, except for the tests of Classification and Parts of the Whole, pertained, as we hypothesized, to media-literacy. The following analyses therefore present mainly the program's effects on this particular domain of skills.

As with the KG sample, heavy viewers (upper quartile) were compared on the posttest scores with light viewers (lower quartile), after all other measured sources of variance had been partialled out. The predicted posttest means of the two quartiles are presented in Table 19. As can be seen, there were significant differences between heavy and light viewers on all tests. Exposure to the program accounted for the largest portions of variance on the tests of Classification, Close-up - Long-Shot, and Parts of the Whole. It accounted for smaller amounts of posttest variance on the remaining tests.

Table 19: Predicted Posttest Means for the Two Extreme Viewing Quartiles in Schools

The Test	Predicted Mean of Lower Viewing Quartile (N=56)	Predicted Mean of Upper Viewing Quartile (N=56)	% of Variance Attributed to Exposure R^2	Standard Error of Prediction (Sy.x)	The Significance of the Differnece Between the Quartiles F	P
Parts of the Whole	12.17	19.60	9.1%	2.11	5.23	< .05
Classification	17.64	29.90	11.6	2.51	8.57	< .01
Field Independence	7.01	11.31	7.8	1.27	4.52	< .05
Ordering of Pictures	1.76	3.09	6.7	0.85	4.80	< .05
Points of View	3.58	5.53	6.0	0.83	4.28	< .05
Figure & Ground	1.01	7.11	7.9	1.24	5.86	< .05
Close-up - Long-shot	5.47	10.69	9.9	1.33	5.59	< .05

Multiple Regression analysis based on the whole school sample (N=224) is presented in Table 20. In this analysis the four measures of exposure are entered separately since their intercorrelations were rather low in comparison to what was found in the KG sample (see Table 11).

The first thing to note is that the socio-economic background of the children had a substantial negative contribution to the variance of enjoyment (-19%) and to the variance of comprehension of the program's content (-22.3%).

Table 20: Amount of Posttest Variance Accounted for by Background, Initial Achievement and Exposure for All School Children (N=224)

Variance of test account for / Source of Variance	SES	Background & Pretest	Total	Contribution of Exposure Measures					
				Viewing		Enjoyment		Comprehension		Sesame Street Test	
	R^2	$+R^2$	ΣR^2	$+R^2$	F	$+R^2$	F	$+R^2$	F	$+R^2$	F
Viewing	- 1.8%	6.3%	8.1%								
Enjoyment	-19.0	6.8	25.8	33.1%	165.47***						
Comprehension	-22.3	9.7	32.0	4.0	12.98**	1.3%	4.44*				
Sesame Street Test	5.5	12.4	17.9	1.7	4.40*	0.9	2.33	6.6%	18.35**		
Parts of the Whole	0.5	8.6	9.1	-0.5	1.14	-0.2	0.50	1.1	2.52	21.8	65.59***
Classification	3.2	13.6	16.8	-0.1	0.28	-1.7	4.12*	0.3	0.71	21.6	72.94***
Field Independence	1.5	19.8	21.3	-0.5	1.22	-1.7	4.70*	1.5	4.04*	5.6	16.60***
Ordering of Pictures	3.2	20.0	23.2	-0.2	0.27	-2.5	6.68**	0.5	1.44	5.9	17.26**
Points of View	8.4	8.8	17.2	-1.3	3.40	-0.1	0.16	0.1	0.01	9.2	26.03***
Figure & Ground	1.2	20.8	22.0	-0.3	0.66	-0.1	0.18	0.4	0.88	11.0	33.76***
Close-up - Long-shot	4.6	12.1	16.7	-1.2	3.02	0.1	0.09	0.1	0.24	23.1	38.16***

* $P < .05$
** $P < .01$
*** $P < .001$

SES accounted also for only a small portion of the Sesame Street Test variance (5.5%). Thus, the pattern of relationships between SES and exposure in the school sample differs markedly from the pattern in the KG sample. While in KG, MC children viewed the program more, enjoyed it more and recalled it better; the opposite was true in the school sample. This is very much in keeping with findings reported earlier (section 1 of this chapter) which showed that while exposure of older MC children declined sharply as the season progressed, that of LC children did not. The former, it was suggested, became fatigued with the program, whose messages appeared to be too childish for them.

The second point to note relates to the contribution of exposure to the variance of the tests. After patialling out the contributions of the background variables and initial achievements, it becomes evident that exposure (or more specifically, the scores on the Sesame Street Test) contributed substantially to the variance of three tests: Parts of the Whole (21.8%), Classification (21.6%) and Close-up - Long-shot (23.1%). Exposure accounted somewhat less for the variance of the test of Figure and Ground (11.0%). It accounted for smaller portions of the variance of the remaining tests.

In general it is possible to state that the program's effect is stronger in the intended goal areas (Classification, and Parts of the Whole) and somewhat less so in the areas of media-literacy. The only exception is the Close-up - Long-shot

test: 23.1% of its variance is attributable to exposure to the program. Otherwise, it appears that exposure to the program accounted for less variance on the media-literacy tests than on the tests of the intended goal areas.

Finally, it is worth comparing the amount of posttest variance attributable to exposure in the school sample with that in the KG sample, with regard to two common tests: Classification and Parts of the Whole. While exposure accounted for only 8.4% of the Classification variance in KG, it accounted for 21.6% in the schools. The respective figures for the Test of Parts of the Whole are 13.3% and 21.8%. Does this mean that the program taught the school children more than the KG ones?

It should be noted at the outset that the total amount of variance of these tests accounted for by background and pretests in KG is far larger than in the schools (53.7% vs. 16.8% for Classification, and 20.3% vs. 9.2% for Parts of the Whole). This suggests that posttest performance of KG children is much more contingent upon their background and prior achievements, while in the schools these relationships are far weaker. Thus, the posttest performance of the school children, being less influenced by home environment, prior knowledge and the like, appears to be more fluid and more responsive to external stimulation.

Nevertheless, it appears to us that comparisons between the gains of KG and school children should be made with caution.

There might be some statistical artifact to account for the large discrepancies between the gains of the two samples.

(2) Who Was More and Who Was Less Affected? In Which Areas?

Separate regression analyses for the LC and the MC groups are presented in Table 21. On the whole, exposure to the program had significant effects on both groups, with the exception of the Figure and Ground test where the LC children were not affected at all by exposure. It can be also seen that the effects of exposure on the media-literacy tests were smaller than their effects on the intended goal areas.

The most important point to note is that the MC children appear to be affected more strongly by exposure than the LC ones. Thus, e.g., while exposure accounted for 21.3% of the Close-up - Long-shot test in the MC group, it accounted for only 12.2% of the variance in the LC group. This difference cannot be explained by different distributions of scores in the two groups, as the standard deviations are surprisingly similar.

Table 21: Amount of Posttest Variance Accounted for by Background Initial Achievement and Exposure for Each SES in Schools

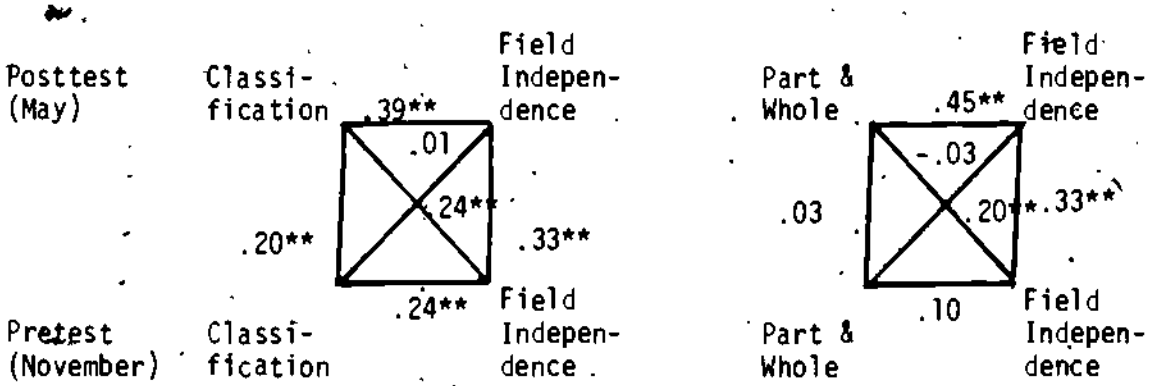
Variance of test accounted for	Source of variance	Background and Pretest	Contribution of Exposure Measures: Viewing		Enjoyment		Comprehension		Sesame Street Test	
		ΣR^2	$+R^2$	F	$+R^2$	F	$+R^2$	F	$+R^2$	F
Viewing	MC	17.8%								
	LC	12.8								
Enjoyment	MC	16.9	9.4%	15.85**						
	LC	24.9	55.0	175.56***						
Comprehension	MC	20.5	0.2	0.27	0%	0				
	LC	28.4	8.8	8.95**	0.9	0.92				
Sesame Street Test	MC	16.6	0	0	1.5	2.30	11.0	18.90**		
	LC	28.5	9.6	9.96**	-2.4	2.54	4.3	4.78*		
Parts of the Whole	MC	10.3	-0.2	0.31	1.5	2.06	0.9	1.23	26.5%	52.61***
	LC	25.6	-0.4	0.34	-1.3	1.09	1.1	0.97	17.1	19.06**
Classification	MC	13.4	0.2	0.34	0.2	0.28	0.1	0.17	30.6	66.76***
	LC	30.1	-0.4	0.38	-2.5	2.32	1.1	0.39	12.9	14.67**
Field Independence	MC	33.8	0	0	0.5	0.95	0.4	0.68	6.7	13.78**
	LC	24.5	-0.3	0.26	-0.8	0.66	1.4	1.19	9.7	9.39**
Ordering of Pictures	MC	23.4	0	0	-1.4	2.39	1.0	1.59	9.8	18.45**
	LC	34.4	-0.1	0.04	-1.8	1.82	0.1	0.03	4.8	5.02*
Points of View	MC	14.8	-1.3	1.88	0.4	0.59	3.2	4.93*	12.0	21.27***
	LC	20.9	-2.2	3.83	-1.3	1.10	-0.5	0.35	8.7	7.98**
Figure & Ground	MC	29.9	-0.1	1.98	0	0.07	3.3	6.01*	14.5	34.27***
	LC	27.7	0.1	0.01	0	0.01	0	0.01	3.7	3.33
Close-up - Long-shot	MC	19.0	-1.4	2.18	1.1	1.68	2.2	0.33	21.3	45.22***
	LC	28.8	-0.1	0.05	0.1	0.10	0	0	12.2	12.65**

* $P < .05$ ** $P < .01$ *** $P < .001$

The only test on which LC seem to have benefited more, relative to their lower starts, was the Field Independence Test. This brings forth our previous hypothesis according to which LC gain more in areas of analysis (particularly visual analysis), while MC benefit more in areas of synthesis and abstraction.

To examine whether this hypothesis is also supported in the school sample, a crossed-lagged panel correlation analysis was performed. It was expected, as before, that since analysis preceeds synthesis, early achievements in the former should predict later achievements in the latter, but not in the opposite order. Field Independence, known to be an analytic test, was intercorrelated with scores on the tests of Classification and Parts of the Whole (assumed to pertain to synthesis) at two points in time. The analyses are presented in Figure 2.

Figure 2: Crossed-Lagged Correlation Panel of Pre- and Posttest of Analysis and Synthesis (N=224)



** P < .01

In spite of the relatively low correlations on the diagonals, they nonetheless tend to confirm our hypothesis, further corroborating the distinction between the areas in which each SES group gains more.

Still another difference between the LC and MC children relates to the amount of variance accounted for by initial achievement and background factors in each posttest. We systematically find that more of the variance is accounted for by these variables in the LC than in the MC group. The only exception is the Field Independence test, where there is a stronger relationship between background and posttest in the MC group. This is also the only test on which the LC benefited from exposure to Sesame Street more than the MC.

It becomes evident that as the contribution of background variables to posttest scores decreases, the contribution of exposure to those scores tends to increase. This is, on first sight, only a statistical artifact. Actually, it suggests a rather important and profound difference. First, it should be noted that no such difference between LC and MC was found in the KG data. Second, there is no evidence to suggest that while the amount of variance accounted for by one source decreases, that another source becomes necessarily a more significant predictor. Nor is it the case that the LC group is either more heterogeneous or more homogeneous from the outset when compared with the MC group. Thus we cannot avoid the conclusion that background

variables predict posttest scores of KG children better than for school children, and that among the latter posttest scores of LC are more contingent upon their background than the achievements of MC children.

A similar finding was reported by McCandless and Roberts (1972). Their study was conducted on 443 7th graders in the U.S. Initial-skill measures were found to be highly correlated with later achievements in their LC sample ($r = .74$), while no such correlation was found in their MC group ($r = .20$). These findings could explain the widening gap between the "information poor" and the "information rich" (Katzman, 1973), which can be evidenced repeatedly in ITV and ETV studies. It appears as a general rule that older and more well-to-do children are more susceptible to educational stimulation than younger and less well-to-do ones. The latter's achievements are more strongly bound by their background and prior achievements.

(3) How Much Was Media-Literacy Affected by the Program?

As we have pointed out already, media-literacy was affected to a lesser extent than the achievements in the original goal areas. Since gains from the program's content were hypothesized to be related to improvements in media-literacy, we examined the relations between them as they changed over time. It was reasonable to hypothesize that while

it was not essential for the two areas to be interrelated before the broadcasting of the program, they should become strongly associated at the end of the season. Such a change should, however, occur in the group of heavy viewers but not in the group of light viewers.

Tables 22 and 23 present the correlations between the tests in the intended goal areas (Parts of the Whole and Classification) and those pertaining to media-literacy. Each table presents the correlations within the light-viewing group (upper triangle) and the heavy-viewing group (lower triangle). Table 22 (see page 92) pertains to the pre-broadcasting testing, while Table 23 (see page 93) pertains to the post-broadcasting testing.

By and large, the correlations between the two areas of concern before the broadcasting of the program are quite low. The pattern changes significantly after the broadcasting season. There is an increase in the correlations in both viewing quartiles. However, the increase in the heavy-viewing group is far more salient than in the light-viewing group (median correlation of all the tests with the goal areas is .56 in the former and .29 in the latter). It thus appears, as expected, that much exposure to the program makes learning of the program's content closely related to media-literacy.

Another question related to improvements in media-literacy is concerned with the psychological mechanisms through

Table 22: Intercorrelations Among the Pretest Measures in Lower and Upper Viewing Quartiles

		1	2	3	4	5	6	7
1.	Parts of the Whole	-	-.29*	.02	.04	.09	.08	-.27*
2.	Classification	-.06		.16	.13	-.11	.08	.07
3.	Field Independence	-.11	.29*	-	.40**	.24	.27*	.12
4.	Ordering of Pictures	-.02	.19	.18	-	.05	.12	.01
5.	Points of View	-.24	-.10	.04	.03	-	.16	.26*
6.	Figure & Ground	-.32*	.30*	.28*	.07	.26*	-	.35*
7.	Close-up - Long-shot	-.20	-.10	.13	.21	.31*	.23	-

Note: Ss in the lower viewing quartile appear in the upper triangle: N=56; Ss of the upper viewing quartile appear in the lower triangle: N=56.

* $P < .05$

** $P < .01$

Table 23: Intercorrelations Among the Posttest Measures in Lower and Upper Viewing Quartiles

		1.	2	3	4	5	6	7
1.	Parts of the Whole	-	.48**	.29*	.25*	.25*	.24	.39**
2.	Classification	.81**	-	.22	.37**	.25*	.31*	.32*
3.	Field Independence	.64**	.56**	-	.24	.28*	.15	.18
4.	Ordering of Pictures	.46**	.58**	.64**	-	.32*	.27*	.54**
5.	Points of View	.52**	.45**	.56**	.40**	-	.16	.41**
6.	Figure & Ground	.35**	.46**	.45**	.60**	.44**	-	.25*
7.	Close-up - Long Shot	.73**	.76**	.61**	.56**	.45**	.46**	-

Note: Ss in the lower viewing quartile appear in the upper triangle: N=56; Ss of the upper viewing quartile appear in the lower triangle: N=56.

* $P < .05$

** $P < .01$

which exposure to Sesame Street may have affected media-literacy skills. As discussed in the opening chapter of this report, two kinds of mechanisms were hypothesized to operate. Skills may have been called upon, or activated, and reinforced, while other skills may have been overtly modeled, or supplanted, allowing for imitation and internalization. We hypothesized that those skills which were measured by the tests of Picture Ordering, Close-up - Long-shot and Field Independence were activated by the program's television formats. Viewers with adequate initial mastery of these skills should be able to further improve in them. In contrast, skills measured by the tests of Points of View and Figure and Groud were assumed to be explicitly modeled or supplanted by the program's formats and hence mainly the poor initial scorers should improve in them. Initially more capable viewers should not improve in these areas, thus zero or negative correlations would be expected between initial and later mastery of the supplanted skills.

Table 24 presents the correlations of each test with itself (pretest correlated with posttest), separately for the heavy and light viewing quartiles.

Table 24: Correlations between Pretests and Identical Posttests in the Two Extreme Viewing Quartiles.

	Among Subjects in the Lower Viewing Quartile (N=55)	Among Subjects in the Upper Viewing Quartile (N=55)
Skills Which Were "Activated":		
Ordering of Pictures	.23	.46**
Close-up - Long shot	.03	.33*
Field Independence	.24	.36**
Skills Which Were "Supplanted":		
Points of View	.26*	.01
Figure & Ground.	.29*	-.40**

* $P < .05$

** $P < .01$

As it becomes evident from the table, correlations between pre- and posttest in the light viewing quartile were relatively low, in fact lower than expected on both types of tests. This is not the case in the heavy viewing quartiles. There, tests of skills which were alleged to be activated by the program's formats, correlated positively with themselves over time, thus indicating that those who had better initial mastery also had better mastery five months later. On the other hand, the correlations between the tests of supplanted skills were

zero or negative, replicating previous findings (Salomon, 1972). It thus appears that children with initially poor mastery benefit more when exposed to an explicit model that supplants a skill, while children with initially fair mastery either fail to benefit or even suffer a loss due, evidently, to interference. We should, of course, be careful in reaching hasty conclusions on the basis of these data, since the differentiation between what was "activated" and what was "supplanted" was not the result of a controlled manipulation but the result of impressions only. Nonetheless, it seems that the findings support the hypothesis and are in accordance with what was found in earlier controlled studies.

(4) Summary

School children were affected by exposure to the program in the original goal areas of achievement as well as in the area of media-literacy. Generally, the school children gained more than KG ones, but a comparison between the two samples may be slightly misleading due to differences in the testing procedures.

Among the school children, MC gained more than LC ones except for in Field Independence in which LC seem to have gained slightly more. Additional analyses tended to provide further support of our hypothesis according to which LC children gained more in the area of visual analysis while MC ones gain more in the area of synthesis.

The school children were more strongly affected in the intended goal areas than in the area of media-literacy. There is evidence to support the hypothesis that improvements in the goal areas, which are based on the program's content, become more closely associated with improvements in media-literacy which result from exposure to the program's formats. Furthermore, it was found that children with initially poor mastery of media-literacy skills benefit more when skills are explicitly modeled or supplanted by the program's formats, while those with better initial mastery benefit more when skills are called upon, or activated.

DISCUSSION AND CONCLUSIONS

Generally, it was found that exposure to Sesame Street differentiially affected children's achievements in the originally intended goal areas and, to a somewhat lesser extent, skill mastery in the area of media-literacy.

The first question which needs to be asked about the findings is whether it was in fact exposure to the program which contributed to the variance of the tests or whether there were other factors involved. This question is important in light of the major statistical method used to analyse the data. It is even more important in light of the fact that among the measures of exposure, it was the Sesame Street Test which accounted for the largest portions of posttest variance. The other measures of exposure (viewing, enjoyment and comprehension) taken on six occasions during the broadcasting season, contributed moderately to the KG posttest, and hardly at all to the posttests of the school children.

The Sesame Street Test included 12 multiple choice items pertaining to salient segments which appeared in the 40 shows over the five months broadcasting season. There was a 25% chance of correctly answering by guessing. A child who guessed could receive a score of only three points without even watching the program. It would be rather impossible to obtain a higher score on the test without ever watching the program.

It therefore stands to reason that the test was a fair measure of one's recollections of what was shown on the screen.

Still, it is the case that Sesame Street Test scores correlated between .59 (in the LC) and .47 (in the MC) with overall comprehension scores in the KG sample, but only .32 and .41 respectively in the school sample. The answer to this is to be found in the data on the consistency of viewing. The older the children, the less consistent their viewing of the program, particularly among the MC. MC grade school children became, as we have seen, less consistent and more haphazard viewers, as the season progressed. Still, their overall comprehension of the program exceeded that of younger children. Thus, no wonder that the correlations between Sesame Street Test scores and periodic comprehension scores were lower in the schools than in the KG. These lowered correlations do not imply, however, that the Sesame Street Test was less valid in the schools.

Moreover, the Sesame Street Test was not a measure of the sheer amount of time devoted to viewing the program. Rather, it was a measure of what the child recalled from the program: a memory factor was tapped by the test. The fact that scores on this test correlated between .16 and .43 with pretest achievements further indicates that the test pertained to intelligent viewing of the program rather than to the amount

of viewing time.[7] It is interesting to note in this respect that while the measure of viewing contributed only a little to posttest variance, it was the measure of intelligent viewing which contributed the most. Indeed, the program was very demanding due, mainly, to its novel formats, thus allowing the child who viewed the program more intelligently to gain from it more.

— It may be concluded that perhaps the most important factor in learning from a program such as Sesame Street is not the actual time spent watching it but rather the intelligent process of viewing. This appears to be especially pronounced in schools where time spent at the screen or enjoyment of the material had little effect. In comparison, enjoyment of KG children had some effect on learning outcomes, particularly when no outside encouragement was given. Enjoyment turns out to be a rather important factor for LC KG children. It loses its importance when a child grows older.

Another question arising from the findings is concerned with the size of gains made by the different age groups. How can we explain the finding whereby the program's effects increase according to the age of the children? Examination of the overall means of viewing, comprehension and scores on the Sesame Street

[7] The variance common to the Sesame Street Test and the pretests was, of course, partialled out in our regression analyses.

Test seem to provide the answer. The overall mean viewing scores of KG children is 3.2, that of G-2 is 4.1, and that of G-3 is 4.6. The mean comprehension scores are 1.65, 3.6, and 3.9, respectively. The mean scores on the Sesame Street Test are 5.13, 7.65 and 8.26 in the same order. Thus, it can be seen that viewing, and especially intelligent viewing increases with age. If it was exposure to the program which, as expected, contributed to achievements, then it becomes evident that the older children who watched more also gained more.

Moreoever, we have also found that achievements of younger and of lower SES children are more strongly tied to their background and prior achievements than the achievements of older and of higher SES children. Achievements which are highly dependent on background factors and on prior achievements are apparently more stable and less susceptible to external stimulation. Nevertheless, we find in certain subtests greater gains for the LC groups than for the MC groups. Exposure to the program, in those cases, accounts for more posttest variance among the LC than among the MC.

Sesame Street, it was observed, was rather demanding to Israeli children due, apparently, to its novel presentation formats. It was hypothesized that its comprehension and the learning of its contents must go hand in hand with improved media-literacy. Such improvements were observed in school children and hardly at all in the KG group. This should come

as no surprise. The media-literacy tests employed in KG were of skills which we assumed to be called upon, rather than supplanted by the program's formats. Skills which were assumed to be overtly supplanted were not dealt with in KG. Some fair initial mastery of a skill is needed to allow its improvement when called upon. However, KG children had rather poor initial mastery of these skills, suggesting that their explicit supplantation would be more effective.

One conclusion which emerges from the study is that a program such as Sesame Street, when transferred to a less television-experienced culture, may turn out to be highly demanding due to the novelty of its formats. Novel formats call upon mental skills with which the less television-wise viewers may not be equipped. Thus, the ones to gain most from the program are the older and initially better able viewers. But they may not be the intended target population, nor the ones who should profit must from such a program.

A second conclusion is that between contents and formats of a program there may be a mismatch, particularly when transferred to a culture for which it was never designed. While the contents of Sesame Street fit universally the age of preschoolers, its formats turn out to be more appropriate for older children. Yet, once the older children succeed in mobilizing the mental skills needed for the processing of the novel formats, they find out that the contents transmitted by

these formats are far too simple or even too childish for them.

However, although the demands placed by the novel formats give an initial advantage to older and better able children, younger and less able ones gradually get adjusted to them. Getting adjusted means becoming better able to master the necessary elements of media-literacy, required by the program's formats. A demanding program such as Sesame Street may, when transferred to other cultures, be initially less effective in teaching its intended contents, but could over time lead to improved media-literacy, and to concommitant gains in educational objectives.

Media-literacy, as we have observed, can be improved, although it is not easily done. It may take much exposure to both skill-supplanting and skill-activating formats to introduce changes in media-literacy. This may turn out to be as desirable an outcome as acquiring specific knowledge inasmuch as it enables children to make better use of television and possibly other visual media.[8] Indeed, it was found in the study that improvements in the knowledge goal areas went hand in hand with changes in media-literacy.

Finally, we turn to the differential effects of the program on LC and MC children. The fact that LC children's

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[8] In a controlled experiment, one group of second graders saw eight Sesame Street shows. When compared to control groups, it was found that the children in the Sesame Street group far exceeded the others in their ability to learn from an unfamiliar science film.

scores were more strongly associated with exposure on some posttests could be interpreted as resulting from a ceiling reached by the MC children. This, however, did not seem to be the case (see tables of pre- and posttest means). We have suggested a distinction between the kinds of tests on which each group gained more. Thus, it was speculated that while LC children gain more on analytic and visual discrimination tests, MC children gain more on tests of synthesis and abstraction. Correlational analyses indicated that the two types of tests are, apparently, hierarchically ordered.

This does not mean, however, that LC profited more, on the whole, than MC children. Rather, it suggests that MC children have reached a reasonable level of mastery in the analytic and discrimination area, thus allowing them to improve more in another, hierarchically higher order set of skills. A possible conclusion one can draw is that the program can be simultaneously effective for audiences of varying educational levels, such that substantial gains can be achieved by both LC and MC children. It should be noted that no gap has been closed between LC and MC children: while the former has improved in an hierarchically lower-order area. It thus appears that Sesame Street allows each SES group to gain in intellectual areas that best complement their initial level of mastery.

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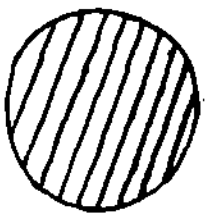
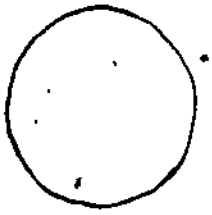
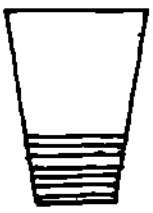
APPENDIX I: EXPOSURE

Appendix Ia: Sample of Exposure Questionnaire

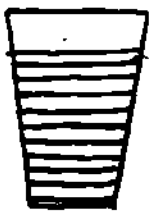
1. Did you watch the television program "Sesame Street" yesterday?

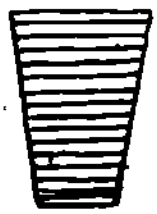
yes  no 

2. How much time did you spend watching the program?


Watched a little


Watched half the time


Watched most of the time


Watched all of the time

3. If you saw the "Sesame Street" program, how much did you enjoy it?


I did not enjoy it.


I enjoyed it a little.


I enjoyed it a lot.

Content Questions:

1. What did Kermit the frog talk about?
   a. Eyes
   b. Cars
   c. Hair
   d. Football.

2. What did the child do in the movie?
   a. Ride on a bicycle
   b. Draw pictures
   c. Played with his friends.
   d. Worked on a fishing boat.

3. What did Bud and Jim do yesterday in the program?
   a. Played on a seesaw
   b. Nailed a nail on the wall
   c. Made a paper plane
   d. Prepared a meal.

4. How did Big Bird find out how much is the number 6?
   a. He counted the number of fingers on his legs
   b. Looked in a book
   c. Asked Mr. Hooper.
   d. Counted half a dozen eggs.

Appendix 1b: Test of Sesame Street

1. Mr. Hooper has a store where he sells:-
   a. Shoes
   b. Cameras
   c. Candy and food
   d. Animals

2. The fat clown bought the thin clown a picture as a present but suddenly discovered that it was not a picture but a:-
   a. Toy
   b. Bicycle
   c. Mirror
   d. Broom

3. The English letter "O" looks like:-
   a. E
   b. O
   c. S
   d. W

4. One time the two clowns tried to put into boxes two pairs of:-
   a. Gloves
   b. Socks
   c. Eye-glasses
   d. Shoes

5. Big Bird is always sad because:-

   a. He doesn't like to wash in a tub

   b. They don't give him ice-cream

   c. He is large, clumsy and hits things

   d. Paint was spilled on him

6. The two clowns walked in the street with a lot of umbrellas; when it started to rain they:-

   a. Forgot to open the umbrellas

   b. Hit each other with the umbrellas

   c. Gave the umbrellas to other people

   d. Opened the umbrellas but did not hold them over their heads

7. Oscar lives in a:-

   a. Cellar

   b. Garbage Can

   c. Bath Tub

   d. Candy Store

8. The two clowns, Bud and Jim, had difficulties hanging a picture of a bird because:-

   a. The nail was too small

   b. They held the nail the wrong way

   c. They did not have a hammer

   d. They were not strong enough

9. Every time they present numbers in the program, at the end:-

   a. Mr. Hooper appears and hands out candy

   b. Balloons go up to the sky

   c. A baker with cakes falls down the stairs

   d. A dog barks a few times

10. One time the clown tried to play:-

   a. Football

   b. On the seesaw

   c. Follow the leader

   d. Hide and Seek

11. The English letter "S" looks like:-

   a. E

   b. O

   c. S

   d. W

12. One day the thin clown brought home a new ironing board.
   How did the two clowns get it into the house?

   a. They broke the walls

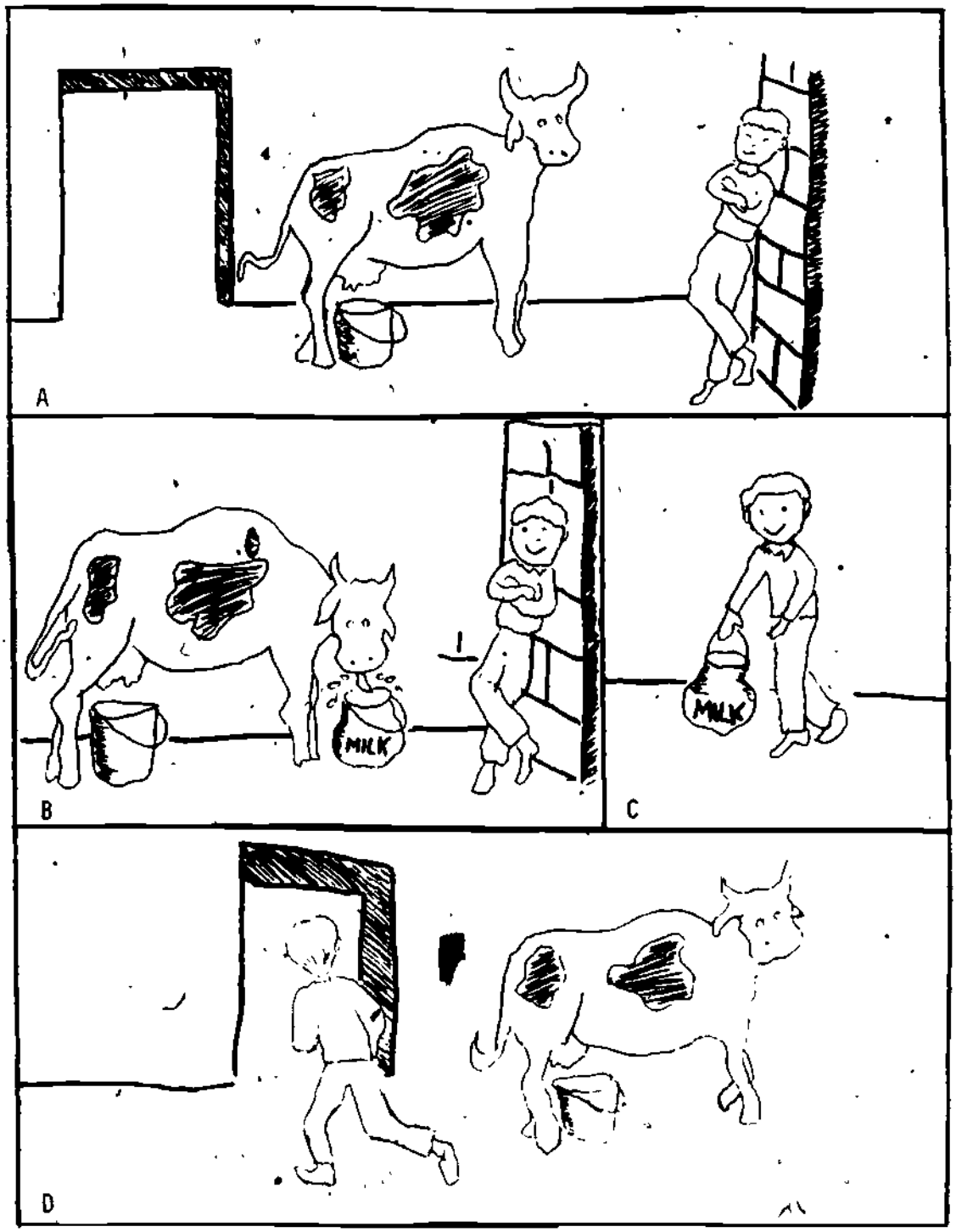
   b. They brought it in through the window

   c. They brought it in through the chimney

   d. They took the ironing board back to the store.

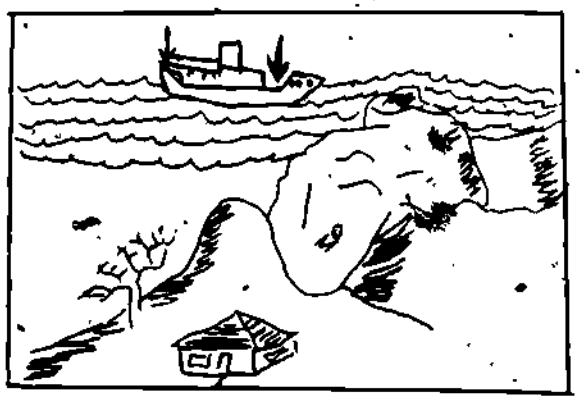
Appendix 2a: Test of Ordering of Pictures

Instructions to child: "Here are a few pictures which tell a story. But they are in a confused order. What should the proper order be.?"



Appendix 2b: Test of Points of View

Instructions to child: "Look at the upper most picture. Think of the sailor on the boat. How would the sailor on the boat see the shore?"



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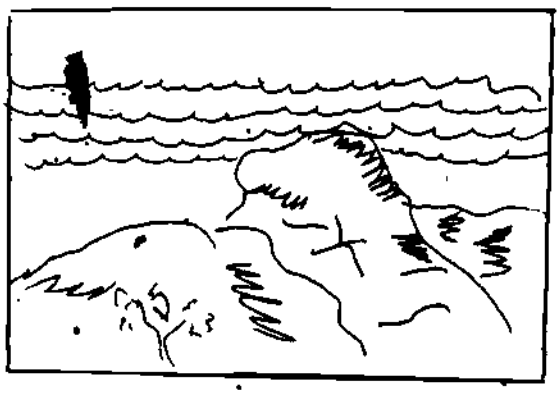

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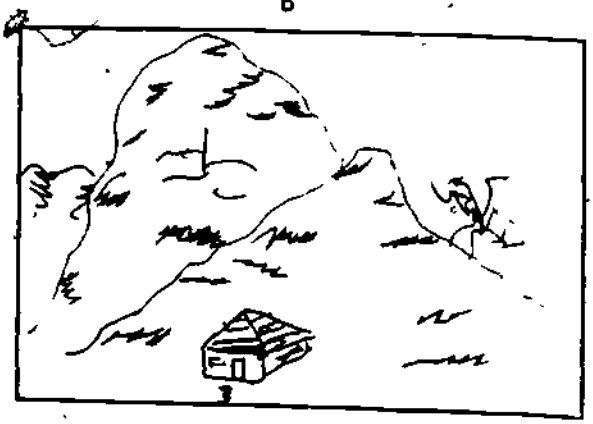

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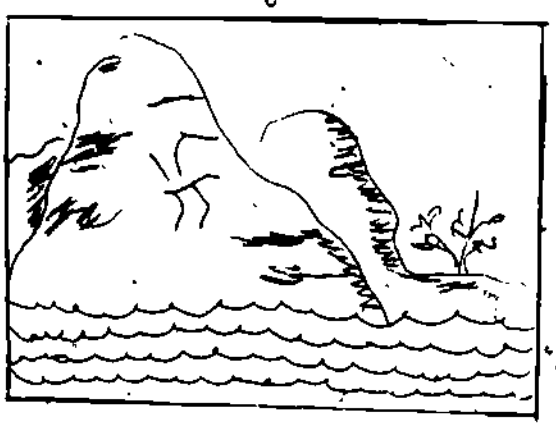

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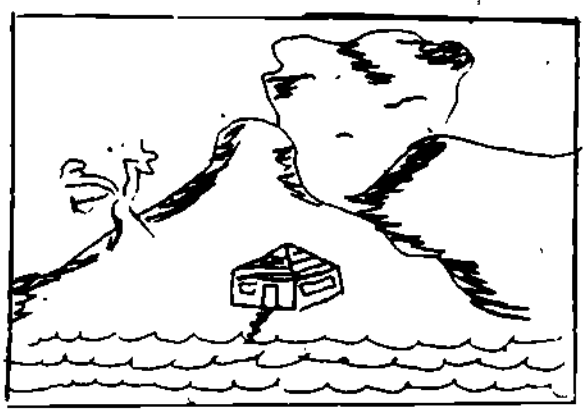
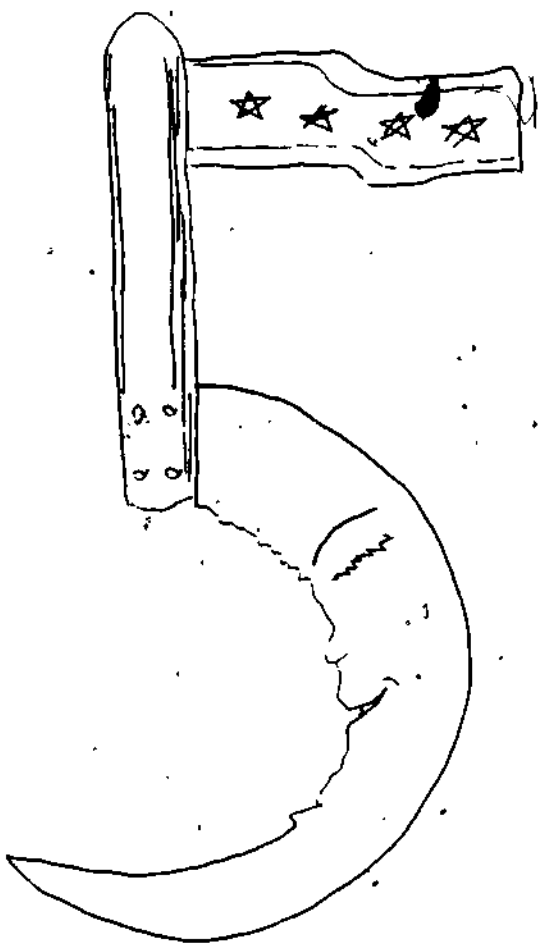


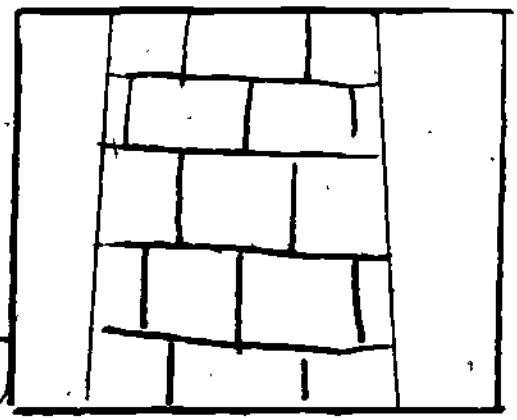
Appendix 2c: Test of Figure and Ground

Instructions to child: "This picture entails many things. Write down everything, large or small, you can see in this drawing".



Appendix 2d: Test of Close-up - Long-shot

Instructions to child: "Look at the upper picture. It is a detail of something larger that appears in one of the four pictures below. In which one of them"?



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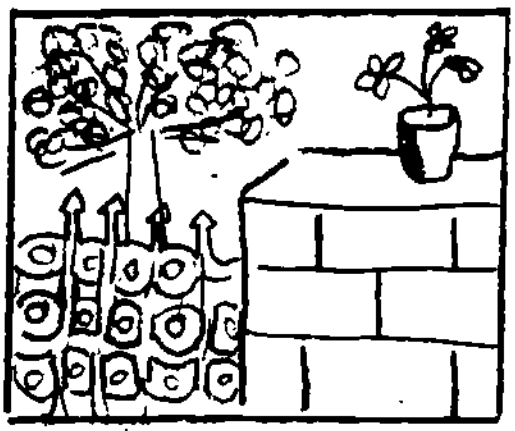

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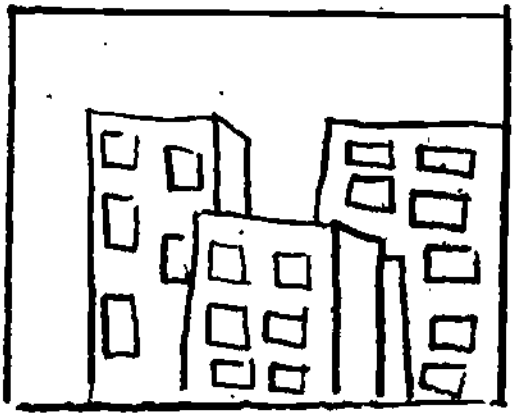

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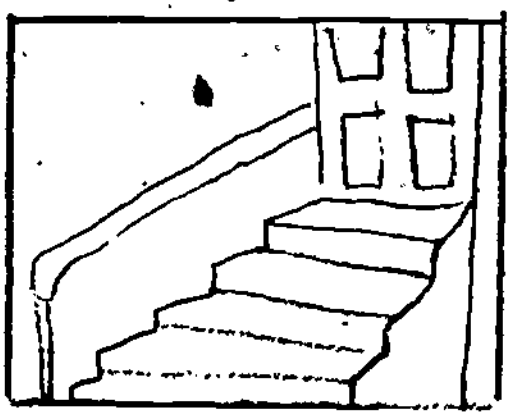

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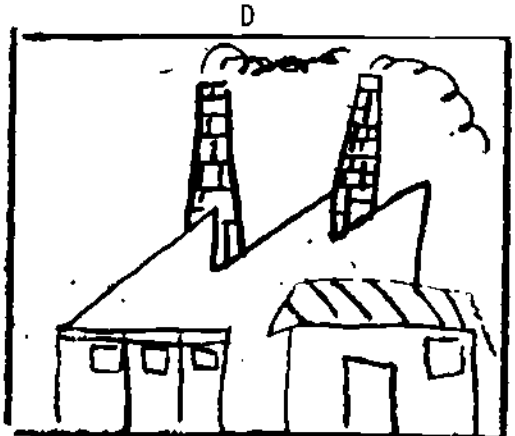

APPENDIX 3

AMOUNTS OF VIEWING, ENJOYMENT, AND COMPREHENSION

Table No. 1: Amount of Viewing on Six Different Occasions (in percents)

The Occasion	Did not View at all	Viewed About a Quarter of the Broad-cast	Viewed About Half of the Broad-cast	Viewed About Three Quarters of the Broadcast	Viewed the Whole Program
I	6	17	7	14	56
II	8	15	5	14	58
III	11	16	6	15	52
IV	11	17	7	14	51
V	7	28	7	20	38
VI	10	32	5	16	37
Overall Mean	9	21	6	15	49

Table No. 2: Amount of Viewing of LC and MC Children on Six Occasions (in Percents)

The Occasion		Did not View at all	Viewed About a Quarter of the Broad-cast	Viewed About Half of the Broad-cast	Viewed About Three Quarters of the Broad-cast	Viewed the Whole Pro-gram
I	LC	4	23	5	16	52
	MC	7	14	8	13	58
II	LC	4	16	6	15	59
	MC	10	14	4	14	58
III	LC	6	20	4	17	53
	MC	16	13	6	14	51
IV	LC	6	20	8	15	51
	MC	15	15	6	13	51
V	LC	4	35	11	13	37
	MC	9	23	4	25	39
VI	LC	8	31	5	13	43
	MC	12	34	5	17	32

Table No. 3: Amount of Viewing on Six Occasions of KG, G-2 and G-3 Children (in percents)

The Occasion		Did not View At all	Viewed About a Quarter of the Broadcast	Viewed About Half of the Broadcast	Viewed About Three Quarters of the Broadcast	Viewed the Whole Program
I	KG	11	14	8	14	53
	2	5	22	3	14	56
	3	2	17	7	16	58
II	KG	14	11	7	15	53
	2	7	15	2	17	59
	3	3	18	6	10	63
III	KG	25	9	4	13	49
	2	6	16	4	18	56
	3	6	22	8	15	50
IV	KG	14	12	8	13	53
	2	12	19	6	15	48
	3	7	19	8	13	53
V	KG	11	24	10	17	38
	2	2	27	4	26	41
	3	9	32	7	16	36
VI	KG	16	24	7	15	38
	2	7	32	2	20	39
	3	8	40	8	11	33

Table No. 4: Amount of Enjoyment on Six Occasions (in percents)

The occasion	Did Not Enjoy	Enjoyned A Little	Enjoyed Very Much
I	22	16	62
II	23	10	67
III	28	13	59
IV	29	11	60
V	35	15	50
VI	42	12	46
OVERALL MEANS	30	13	57

Table No. 5: Amount of Enjoyment on Six-Occasions of LC and MC Children (in percents)

The Occasion		Did Not Enjoy	Enjoyed A Little	Enjoyed Very Much
I	LC	26	13	61
	MC	19	18	63
II	LC	20	12	68
	MC	24	10	66
III	LC	25	14	61
	MC	29	11	59
IV	LC	26	13	61
	MC	30	11	59
V	LC	38	16	46
	MC	32	15	53
VI	LC	37	9	54
	MC	46	14	40

Table No. 6: Amount of Enjoyment on Six Occasions of KG, G-2 and G-3 Children (in percents)

The Occasion		Did Not Enjoy	Enjoyed a Little	Enjoyed Very much
I	KG	24	19	57
	G-2	23	17	60
	G-3	18	14	68
II	KG	26	15	59
	G-2	21	10	69
	G-3	21	7	72
III	KG	33	12	55
	G-2	22	16	62
	G-3	28	11	61
IV	KG	26	15	59
	G-2	32	9	59
	G-3	27	11	62
V	KG	35	14	51
	G-2	30	12	58
	G-3	39	21	40
VI	KG	41	7	52
	G-2	39	14	47
	G-3	47	13	40

Table No. 7: Comprehension on Six Different Occasions (in percents)

The Occasion / Answered Correctly . . .	1 Question	2 Questions	3 Questions	4 Questions
I	39	22	22	17
II	32	22	16	30
III	31	11	9	49
IV	35	7	8	50
V	41	9	8	42
VI	48	8	10	34
Overall Mean	37.5	13	12	37

Table No. 8: Comprehension of LC and MC Children on Six Different Occasions (in percents)

The Occasion	Answered Correct.	1 Question	2 Questions	3 Questions	4 Questions
I	LC	51	26	17	6
	MC	30	17	27	26
II	LC	35	37	19	9
	MC	30	11	15	46
III	LC	30	20	13	37
	MC	31	4	7	58
IV	LC	37	12	12	39
	MC	33	3	5	59
V	LC	51	12	11	26
	MC	34	5	5	56
VI	LC	46	13	9	32
	MC	49	3	11	37

Table No. 9: Comprehension of KG, G-2 and G-3 Children on Six Different Occasions (in percents)

The Occasion	Answered Correctly...	1 Question	2 Questions	3 Questions	4 Questions
I	KG	58	28	9	5
	G-2	37	23	28	12
	G-3	27	12	28	35
II	KG	34	30	13	23
	G-2	36	21	17	26
	G-3	26	17	17	40
III	KG	40	22	14	24
	G-2	25	8	5	62
	G-3	28	3	10	59
IV	KG	43	13	13	31
	G-2	33	4	7	56
	G-3	28	6	4	62
V	KG	48	8	11	33
	G-2	34	7	7	52
	G-3	42	9	6	43
VI	KG	54	10	14	22
	G-2	42	5	8	45
	G-3	50	6	8	36

Table No. 10: Comprehension on Six Different Occasions by SES and Age (in percents)

The Occasion	Answered Correctly...	Question 1		Question 2		Question 3		Question 4	
		LC	MC	LC	MC	LC	MC	LC	MC
I	KG	66	48	29	27	5	14	0	11
	G-2	51	28	28	20	13	38	9	14
	G-3	32	23	18	8	39	21	11	48
II	KG	34	34	38	20	20	5	9	41
	G-2	43	32	36	12	13	20	9	37
	G-3	26	25	39	4	26	13	8	58
III	KG	36	45	36	5	14	14	14	36
	G-2	28	22	13	5	4	5	55	67
	G-3	24	31	5	1	21	4	50	62
IV	KG	52	32	14	11	14	11	20	46
	G-2	28	37	6	1	13	4	53	58
	G-3	26	30	16	0	8	1	50	69
V	KG	54	41	11	5	16	5	19	50
	G-2	55	21	9	5	2	11	34	63
	G-3	42	42	18	6	16	0	24	52
VI	KG	55	48	16	7	13	16	16	30
	G-2	38	45	9	3	6	9	43	43
	G-3	39	55	16	1	5	10	39	33