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The acquisitions of cognitive skills as a function of a television programme

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2015-03-16
http://hdl.handle.net/10539/17287

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TABLE 9 SOCIO-ECONOMIC STATUS ACCORDING TO PARENT OCCUPATION

Socio-Economic level	Dorkas %	Jubilee %	Holy Rosary %
Upper	42,50	35,83	27,01
Middle	27,50	31,55	29,31
Lower	20,00	28,88	28,74
Total	90,00	96,26	85,06

The total percentages presented above reflect less than 100% of the people examined since the remaining percentages of people in each group were pensioners, housewives, disabled and unemployed people who do not fit into any of the above class categories.

From Table 9 above it appears that the highest percentage of "high class" children go to Dorkas Crèche and the highest percentage of lower middle to low class children go to Jubilee Crèche and Holy Rosary Nursery School. It is thus possible that the scores of children at Dorkas Crèche will be higher than those of children at Jubilee or Holy Rosary crèche since it has been found by Noble (1975) that children of higher socio-economic status learn to comprehend the content of a television programme before the same age of children of lower socio-economic status.

At the start of testing the number tested in each child care centre group was 25 control group children and 25 experimental group children. However, after a number of children had fallen out due to absence from school, the number of children in each child care centre was the following:

TABLE 10 FREQUENCIES OF SUBJECTS IN CHILD CARE CENTRE GROUPS

Child Care Centre	Control Group		Experimental Group		% of total C & E Ss in each centre
	Number	% of group	Number	% of group	
Jubilee Crèche	25	35,71	24	34,29	35,00
Dorkas Crèche	23	32,86	21	30,00	31,43
Holy Rosary Nursery School	22	31,43	25	35,71	33,57

Thus over the total sample 35,00% of children came from Jubilee Crèche, 31,43% from Dorkas and 33,57% from the Holy Rosary Nursery School. However none of these frequencies represent significant differences.

Sex Groups

The number of children compared according to sex groups is indicated in Table 11 below.

TABLE 11 FREQUENCIES OF SUBJECTS ACCORDING TO SEX GROUPS

	Control Group		Experimental Group		% total of C & E Males	% total of C & E Females
Sex	Number	% of group	Number	% of group		
Male	39	55,71	34	48,57	52,14	
Female	31	44,29	36	51,43		47,86

From this table it can be seen that whilst there were more males than females in the control group, this pattern was reversed in the experimental group. Over the total sample, 52,41% were males while 47,86% were females but this is not a statistically significant difference.

The data were inspected to ascertain if females improved more than males or vice versa.

Age Groups

Three different age groups were tested to see if older children learnt more than younger ones or vice versa.

The number of children tested according to age group was the following:

TABLE 12 FREQUENCIES OF SUBJECTS ACCORDING TO AGE GROUPS

Age	Control Group		Experimental Group		% total of C & E Ss for each age group
	Number	% of group	Number	% of Group	
3,4 to 4,4 years	20	28,51	18	25,71	27,14
4,5 to 5,5 years	28	40,00	25	35,72	37,86
5,6 to 6,6 years	22	31,43	27	38,57	35,00

According to these frequencies it appears that the youngest children form the smallest group (27,14% of the total sample), middle children form the largest group (37,86% of the total sample) and oldest children make up the medium group (35,00% of the total sample).

Although an attempt was made to test a similar number of children in each age group this was not found to be practical. Nine younger children found the testing situation frightening and so would not respond at a level satisfactory to minimal performance. For this reason nine older children were tested since they were not traumatised by the testing situation.

Language Differences

Children in the present study were English speaking, Afrikaans speaking or bilingual. Since the television programme was presented in English this investigation attempted to see if English speakers would improve more than their Afrikaans speaking peers on testing. Since difficulty arose in adequately evaluating bilingualism, the tests were administered in English and Afrikaans according to the preference of the child and they were scored in terms of their particular language group.

The number of children in each language group was the following:

TABLE 13 FREQUENCIES OF SUBJECTS ACCORDING TO LANGUAGE GROUPS

	Control Group		Experimental Group		% total of C & E English Speakers	% total of C & E Afrikaans Speakers
Language	Number	% of control group	Number	% of Exp. group		
English	50	71,43	47	67,14	69,28	
Afrikaans	20	28,57	23	32,86		30,72

It will be seen from the above frequencies that English Speaking children formed the majority of the sample (69,28% of the total sample) and Afrikaans speaking children formed a much smaller group (30,22 of the total sample).

Television Viewing Groups

Since television is still a relatively new medium in South Africa having been introduced into this country in early 1976, its saturation in the community is not maximal. Thus whilst the sample comprised a large percentage of children who were regular viewers some of the children had rarely or never seen television. It was thought that previous exposure to other television programmes would affect the response of children to the viewing of Bright Rides, thus the sample was grouped into two groups: 1) Regular televiewing (four or more times a week) and 2) Rare televiewing (three times a week or less).

The number of children in each televiewing group was the following:

TABLE 14 FREQUENCIES OF SUBJECTS ACCORDING TO TELEVIEWING GROUPS

	Control Group		Experimental Group		% total of C & E televiewers	% total of C & E rare televiewers
Televiewing Frequency	Number	% of group	Number	% of Exp. group		
Regular Televiewing	50	71,43	46	65,71	68,51	
Rare Televiewing	20	28,51	24	34,29		31,43

Thus in the total group 68,5% were regular televiewers wi

31,43% were rare televiewers.

11.3 Description of Scores:

Having described the sample children according to a number of background variables, the analysis turns to a description of the scores they achieved on testing. Three tests were administered twice to each child in the experimental and control groups. The tests were the following:

1. M-Test - Pretest and Posttest
   made up of 12 subtests (See Appendices E2, E3 and E4).

2. Peabody Picture Vocabulary Test (PPVT) - Pretest (Form B and Posttest (Form A). See Appendices F1 & F2).

3. Draw a Person Test (DAP) - Pretest and Posttest

Means, standard deviations and ranges were calculated on all the relevant variables in the control and experimental groups. A full list of these can be found in Appendix A3 and A4. An abstract of the most important ones are presented in Table 15 below.

TABLE 15 MEANS, STANDARD DEVIATIONS VARIATIONS AND RANGES

Variable	No. of cases	Mean	Standard Deviation	Kur-tosis	Skew-ness	Mini-mum	Maxi-mum
Total of Cognitive Skills Test (Mt)							
Control Pretest	70	50,957	10,092	-0,546	-0,559	5	80
Control Posttest	70	50,214	11,847	-0,656	-0,254	11	89
Experi-Pretest	70	53,743	12,774	-0,954	-0,102	20	83
mental Posttest	70	63,271	15,427	-0,877	-0,115	25	98
Peabody Picture Vocabulary Test (PPVT)							
Control Pretest	70	74,414	13,508	-0,893	-0,090	47	102
Control Posttest	70	73,929	14,639	-0,547	-0,218	40	103
Experi-Pretest	70	71,543	12,452	-0,261	-0,719	35	94
mental Posttest	70	76,043	13,987	-0,455	-0,315	45	107
Draw a Parson Test (DAP)							
Control Pretest	70	4,158	1,624	1,348	-0,569	0	8,06
Posttest	70	4,034	1,719	0,871	-0,494	0	7,09
Experi-Pretest	70	4,354	1,108	0,894	-0,546	0	7,09
mental Posttest	70	4,730	1,039	0,446	-0,564	3	8,00

11.3.1. Total of Cognitive Skills Test:

The range of subtests which go to make up this total are to be found in Appendix A3 and A4. The means and standard deviations calculated for each of the following groups are:
Control pretest, control posttest, Experimental pretest, experimental posttest. (See Table 15 above.) The scores of each distribution are approximately normally distributed although all the group scores are slightly skewed to the lower end of the distribution. The minimum and maximum scores obtained are shown in Table 15 but the minimum possible score is 0 and the maximum possible score is 146.

The maximum score achieved is much lower than the maximum score possible indicating that a cognitive skills deficit exists in the ability of the sample children.

11.3.2. Peabody Picture Vocabulary Test (PPVT):

The mean scores in this test indicate the average intelligence quotients of each control and experimental group as measured by verbal knowledge ability. The scores of all four groups fall into a category for low learners; those below an IQ of 75 are 'very slow learners' and those between IQ s of 75 and 89 are 'slow learners'. (Peabody manual p 11). These scores appear to indicate that the sample is made up of children with low measured verbal intelligence which is probably attributable to cultural disadvantage or the Western bias of the test. The scores are approximately normally distributed, although the high standard deviation, indicates a wide spread of scores around the mean. The scores are also slightly skewed toward the lower end of the distribution. Minimum and maximum intelligence quotients indicate the range of measured verbal mental ability in the sample.

11.3.3. Draw a Person Test (DAP):

The mean scores of this test indicate the average mental ages of each group as measured by non-verbal intelligence. The scores of all four groups approximate the average chronological age of the group which is 4,83 years indicating that the sample is within normal intelligence limits on non-verbal intelligence ratings. This distribution also approximates a normal one, with a slight

tendency to skewness towards the lower end of the distribution. Minimum and maximum mental ages presented in Table15 above indicate the range of mental ages of children in the sample.

11.4. Factor Analysis:

The Cognitive Skills Test (M-test) was made up of 12 subtests with different cognitive requirements, for example a verbal or non-verbal response mode, or visual discrimination as opposed to an audio discrimination set. Factor analysis was thus conducted to investigate if subtests could be grouped into common factors in order to eliminate the multiplicity of tests.

Four tables of factor analysis data are to be found below.

Table16 describes pre-test scores on the control group.

Table17 describes pre-test scores on the experimental group.

Table18 describes post-test scores on the control group.

Table19 describes post-test scores on the experimental group.

The reason for conducting four factor analyses was to investigate whether factor groupings would be the same in each experimental condition; in which case the range of tests could be contracted into a few factors. However, if factor groupings were dissimilar for each group, one could not conclusively accept that any set of factors went to make up any one factor and thus one would have to analyse each test separately.

In conducting the factor analysis technique, principal factor with iterations was employed as the direct method. Kaiser's criterion

was employed to decide how many factors were to be extracted. According to this rule only factors having latent roots greater than one were considered as common factors. According to Cattell, (1952) Kaiser's criterion is most reliable when the number of variables is between 20 and 50. He notes further that where the number of variables is less than 20, there is a slight tendency for this method to extract a conservative number of factors. In this study the number of variables is 15 (12 subtests, 1 total score and two scores for PPVT and DAP), thus a tendency toward a conservative extraction of factors is indicated.

In order to decide which factor loadings are worth considering, Child (1970 p 45) recommends that items of loading 0,3 and greater are significant providing that the sample size is greater than 50. Since the present sample size is 70 for each factor analysis group, this criterion may be adopted.

The rotation method employed in this study is Kaiser's (1958) Varimax solution which provides an orthogonal rotation with unambiguous positions for the new reference axes. According to Kerlinger (1964) varimax is probably the best method of analytic orthogonal rotation, and is probably the most often used method, being widely available in computer programmes.

In using the varimax rotation method, communalities are equal to less than one because an estimate equal to the largest correlation for each variable was inserted in the relevant leading diagonal, before the rotation was commenced.

Tables 16 to 19 show 1) one factor matrix, namely the varimax rotation method 2) Latent roots or Eigenvalues 3) Communalities. In addition, the following should be noted: a) According to Kaiser's criterion, common factors are those factors that have eigenvalues of greater than one. The remaining factors have tests containing unique variance. b) Loadings of 0,3 or greater are significant. c) The leading diagonals contain communalities of less than one, since the varimax rotation method was used.

TABLE 16. 1 2 AND 3 CONTROL PRETEST DATA FROM FACTOR ANALYSIS

TABLE 16.1 ESTIMATED COMMUNALITIES, EIGENVALUES AND PERCENTAGES RESULTING FROM CORRELATION OF VARIABLES

VARIABLE	EST. COMMUNALITY	FACTOR	EIGENVALUE	% OF VAR	CUM %
Body Parts	0,65404	1	5,20440	32,5	32,5
Geometric Forms	0,49336	2	1,79321	11,2	43,7
Identifying	0,49002	3	1,58261	9,9	53,6
Matching	0,50316	4	1,38193	8,6	62,3
Letters	0,44481	5	1,07574	6,7	69,0
Numbers	0,87821	6	0,93977	5,9	74,9
Relational Terms	0,75207	7	0,69635	4,4	79,2
Classifying	0,50316	8	0,65857	4,1	83,3
Sorting	0,38330	9	0,57786	3,6	87,0
Parts of Whole	0,56476	10	0,50935	3,2	90,1
Emotions	0,34913	11	0,42977	2,7	92,8
Attitudes (H)	0,69496	12	0,37916	2,4	95,2
Attitudes (S)	0,69496	13	0,32072	2,0	97,2
Total	0,87821	14	0,23330	1,6	98,7
PPVT	0,21699	15	0,21515	1,3	100,0
DAP	0,65216	16	0,00000	0,0	100,0

TABLE 16.2 COMMUNALITIES, FACTOR GROUPINGS, EIGENVALUES AND PERCENTAGES RESULTING FROM MATRIX USING PRINCIPAL FACTOR WITH ITERATIONS

VARIABLE	EST. COMMUNALITY	FACTOR	EIGENVALUE	% OF VAR	CUM %
Body Parts	0,58683	1	4,87027	55,3	55,3
Geometric Forms	0,42058	2	1,43356	16,3	71,6
Identifying	0,53787	3	1,07999	12,3	83,9
Matching	0,49440	4	0,83494	9,5	93,3
Letters	0,36619	5	0,58677	6,7	100,0
Numbers	0,76707				
Relational Terms	0,73804				
Classifying	0,56338				
Sorting	0,26040				
Parts of Whole	0,59910				
Emotions	0,29531				
Attitudes (H)	0,69866				
Attitudes (S)	0,72008				
Total	0,98744				
PPVT	0,18167				
DAP	0,58851				

TABLE 16.3 VARIMAX ROTATED FACTOR MATRIX

VARIABLE	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5
Body Parts	0,21126	0,33102	0,29251	0,58328	-0,08270
Geometric Forms	0,18862	0,16866	-0,10245	0,58807	0,01523
Identifying	-0,12214	0,53110	0,19007	0,42047	-0,16725
Matching	0,03348	0,64810	-0,00094	0,19420	0,18851
Letters	0,11754	0,25007	0,25660	-0,03946	0,47163
Numbers	0,30988	0,01936	0,19783	0,54459	0,57874
Relational Terms	0,64783	0,37075	0,07723	0,38490	0,16366
Classifying	0,31236	0,67736	0,04249	0,03405	0,06354
Sorting	0,01201	0,43690	-0,04991	0,13235	-0,05629
Parts of Whole	0,68231	0,18726	0,08124	0,21031	-0,21831
Emotions	0,51997	-0,08431	-0,00450	-0,06725	0,11525
Attitudes (H)	0,10104	0,10711	0,80296	0,14709	0,10295
Attitudes (S)	0,01281	0,09023	-0,54312	0,00295	0,03025
Total	0,43305	0,37125	0,22765	0,67043	0,40097
PPVT	0,05672	0,05741	0,07975	0,04800	-0,41082
DAP	0,34039	0,42930	0,15461	0,31189	0,41885

11.4.1 Control Pretest Data:

According to Table 16.2 five factors were extracted after the principal factor method was employed on control pretest data. It appears however, that only the first three factors contain tests with common variance (eigenvalues equal one or more) and that the last two factors contain tests with unique variance (eigenvalues are less than one). After performing the Varimax rotation, the following factors emerged:

Factor 1 Non-Verbal and Abstract Reasoning

The amount of common variance shared by tests in this factor was 55,3%. The highest loadings occurred on parts of whole (0,682) in which a child was asked to point to one of four pictures that made up the whole from the parts shown to him), and on relational terms (0,647) in which a child had to point out a picture that represented a relationship of size, position, amount or distance), both of which required a greater amount of non-verbal than verbal reasoning and responding. Medium to high loadings appeared on emotions (0,519) in which a child identified, verbally or non-verbally whether a picture presented to him represented a happy or sad situation). The total of the subtests and the Draw a Person also loaded significantly (0,433 and 0,340 respectively) indicating that non-verbal reasoning is a significant aspect of the cognitive skills test. It is possible that the common variance shared by the above-named tests, related to them being skills of abstract reasoning. For example, the numbers test (0,309) was a test in which conservation and number correspondence were abstract concepts, and classification

(0,312) was another abstract concepts test (in which a child selected one of four pictures that "was like" the other pictures or objects).

Thus, factor one seemed to group together tests involving non-verbal responding and abstract reasoning which are both inter-related concepts.

Factor 2 Visual Discrimination

The percentage of common variance shared by tests was 16,3 %. Significant loadings occurred on classification (0,677) (described above), matching (0,648) in which a child pointed to one of four pictures, letters or numbers that matched the stimulus); identifying (0,531) in which a child named community members and places, in pictures shown to him) sorting (0,486) in which a child selected one of five pictures that was different in size, number or function from a group of other pictures), relational terms (0,370, previously described) and body parts (0,331) naming and recognising parts of the body and its functions). Each of these tests required that the child employ visual discrimination although both verbal and non-verbal responding was required. These tests seemed to relate to the total subtest score with a significant loading of 0,371 and to non-verbal intelligence (DAP, loading of 0,429). According to these factor loadings, tests of visual discrimination appeared to be functions of non-verbal reasoning.

Factor 3 Personal emotions and attitudes

Common variance of 12,3% was shared by tests in this factor.

This factor was made up of two measures of the attitudes test (in which a child had to indicate whether he personally felt happy or sad when for example, he was reciting the alphabet or relating to friends and family). A highly significant positive loading appeared on "happy" attitudes (0,802) and a highly significant negative loading (-0,843) appeared on "sad" attitudes.

Thus this factor indicated that children responded positively to themselves, others and school, with the high negative sadness score lending support to the high happiness score. In addition the marked polarity in happy versus sad scores showed that the attitudes test appeared to test reliably for these two responses.

Factor 4

Although tests of this factor did not show significant common variance (since eigen-values were less than one), significant loadings appeared on the total score (0,670) on body parts (0,583), geometric forms (0,588), identifying community members and places (0,420) and number recognition (0,544). These tests appeared to have a common property in that they all involved a naming or identifying function. However, parts of the numbers test and the relational terms test (0,384) related to abstract reasoning. Non-verbal intelligence in the Draw a Person test (0,311) also loaded significantly. In general this factor seemed to include a range of varied cognitive skills which exhibited unique variance on this factor and common variance on previously mentioned factors.

Factor 5

Whilst tests on this factor did not exhibit common variance, unique variance was indicated. Significant loadings occurred on numbers (0,578) letters (0,471), the total subtest score (0,400) and the DAP (0,408) and the Peabody Picture Vocabulary Test (-0,408). It appeared that whilst numbers, letters and the total score were minimally related to non-verbal intelligence, these scores were negatively related to verbal proficiency.

TABLES 17.1, 2 AND 3 EXPERIMENTAL PRETEST DATA FROM FACTOR ANALYSIS

TABLE 17.1 ESTIMATED COMMUNALITIES, EIGENVALUES AND PERCENTAGES RESULTING FROM CORRELATION OF VARIABLES

VARIABLE	EST. COMMUNALITY	FACTOR	EIGENVALUE	% OF VAR	CUM %
Body Parts	0,52222	1	4,81790	30,1	30,1
Geometric Forms	0,32998	2	2,07071	12,9	43,1
Identifying	0,43200	3	1,27601	8,09	51,0
Matching	0,46261	4	1,18403	7,4	58,4
Letters	0,35418	5	1,07100	6,7	68,1
Numbers	0,88146	6	0,97576	6,1	71,2
Relational Terms	0,44999	7	0,93939	5,9	77,1
Classifying	0,46858	8	0,76556	4,8	81,9
Sorting	0,35202	9	0,70438	4,4	86,3
Parts of Whole	0,53936	10	0,62314	3,9	90,2
Emotions	0,40922	11	0,49839	3,1	93,3
Attitudes (H)	0,82266	12	0,33724	2,1	95,4
Attitudes (S)	0,82266	13	0,32827	2,0	97,4
Total	0,88146	14	0,27959	1,7	99,2
PPVT	0,32987	15	0,13257	0,8	100,0
DAP	0,62901	16	-0,00000	-0,0	100,0

TABLE 17.2 COMMUNALITIES, FACTOR GROUPINGS, EIGENVALUES AND PERCENTAGES RESULTING FROM MATRIX USING PRINCIPAL FACTOR WITH ITERATIONS

VARIABLE	COMMUNALITY	FACTOR	EIGENVALUE	% OF VAR	CUM %
Body Parts	0,57879	1	4,44240	54,1	54,1
Geometric Forms	0,27029	2	1,79000	21,8	75,8
Identifying	0,38053	3	0,80255	9,8	85,6
Matching	0,42240	4	0,65234	7,9	93,6
Letters	0,42124	5	0,52975	6,4	100,0
Numbers	0,85680				
Relational Terms	0,38085				
Classifying	0,36506				
Sorting	0,28825				
Parts of Whole	0,55153				
Emotions	0,25927				
Attitudes (H)	0,82460				
Attitudes (S)	0,80766				
Total	0,96250				
PPVT	0,20122				
DAP	0,64504				

TABLE 17.3 VARIMAX ROTATED FACTOR MATRIX

VARIABLE	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5
Body Parts	0,10259	0,70619	0,02436	0,18245	0,18888
Geometric Forms	0,28020	0,39105	0,03829	0,03876	0,18944
Identifying	0,24504	0,46188	0,22790	0,19550	-0,13038
Matching	0,28126	0,10952	0,08284	0,20149	0,53276
Letters	-0,08355	-0,13758	0,60752	-0,03439	0,15883
Numbers	-0,18099	-0,05729	0,43600	0,59420	0,52685
Relational Terms	0,09693	0,33911	0,49044	0,11660	0,04822
Classifying	0,05349	0,15746	0,13171	0,08296	0,55962
Sorting	0,20530	0,01751	0,01229	0,48564	0,09399
Parts of Whole	0,19543	0,45984	0,03204	0,52760	0,14998
Emotions	0,05845	0,10562	0,43724	0,16029	0,10140
Attitudes (H)	0,84919	0,22914	-0,01484	0,20666	0,08967
Attitudes (S)	-0,89693	-0,05035	-0,04274	-0,11203	-0,06400
Total	0,01318	0,36354	0,48557	0,53979	0,55046
PPVT	-0,08510	0,33954	0,07941	-0,07392	0,25869
DAP	0,14130	0,27636	0,44328	0,59368	0,02720

11.4.2 Experimental Pretest Data:

According to Table 17.2, five factors were extracted after the principal factors method was employed on the experimental pre-test scores. However, only the first two factors contained tests with common

variance (eigenvalues were equal to one or greater than one) and the last three factors contained tests with unique variance (eigenvalues were less than one). After performing the varimax rotation the following hypothetical constructs were extracted for each factor.

Factor 1 Personal emotional attitudes

Common variance shared by tests on this factor was 54,1 %
This factor corresponded to the third factor in the control pre-test data and indicated a marked polarity between high positive scores for happy attitudes (0,849) and high negative scores for sad attitudes (-0,886). Thus the principal factor in the experimental pre-test group was the emotional attitudes test.

Factor 2 Verbal Intelligence

The amount of common variance shared by rests on this factor was 21,8%. Significantly high loadings occurred on body parts (0,706), identifying community members and places (0,461), geometric forms (0,391) which were verbal skills requiring recognising and labelling responses. In addition the total test score (0,363) and PPVT scores (0,363) loaded significantly indicating that verbal intelligence was a function of the total battery and of the above-named subtests. However, parts of whole and relational terms also loaded significantly (0,459 and 0,339 respectively) although they seemed to relate to non-verbal intelligence on the control group scores. It is feasible however, that these two tests which required abstract reasoning depended on both verbal and non-verbal intelligence.

Factor 3

Whilst tests on this factor did not show common variance, (the eigenvalue was less than one) certain tests exhibited significant loadings and this appeared to have unique variance. Unique variance may be divided into specific and error variance, and the tests in this factor probably had both types. It appeared that the high loading on the letters test (0,607) was unique to factor three and was thus possibly high in specific variance and low on error variance or unreliability. Other significant loadings appeared on the total subtest (0,485), relational terms (0,490), numbers (0,436) emotions (0,437) and DAP (0,443) and were likely to contain both specific and error variance. Since the eigenvalue of this factor was close to one, (0,80) a relationship might have existed between the abovementioned tests,indicating that they were tests of abstract reasoning which related to non-verbal intelligence.

Factor 4

Tests on this factor also appeared to exhibit unique variance each containing specific and error variance. However, they appeared to load similarly with DAP scores indicating a property of non-verbal intelligence. Loadings were the following: numbers (0,594); sorting (0,485); parts of whole (0,527); Total (0,539) and DAP (0,593).

Factor 5

Subtest scores once again exhibited unique variance on this factor. Significant loadings were similar in weight, with matching(0,532); numbers (0,526); & classification (0,559) appearing to relate to the

total score (0,550).

TABLES 18.1, 2 AND 3 CONTROL POSTTEST DATA FROM FACTOR ANALYSIS

TABLE 18.1 ESTIMATED COMMUNALITIES, EIGENVALUES AND PERCENTAGES

VARIABLE	COMMUNALITY	FACTOR	EIGENVALUE	% OF VAR	CUM %
Body Parts	0,99907	1	5,38956	33,7	33,7
Geometric Forms	0,99642	2	1,97624	12,4	46,0
Identifying	0,99534	3	1,40804	8,8	54,8
Matching	0,98921	4	1,26433	7,9	62,7
Letters	0,99244	5	1,11231	7,0	69,7
Numbers	0,99991	6	0,75744	4,7	74,4
Relational Terms	0,99760	7	0,70809	4,4	78.9
Classifying	0,99671	8	0,67080	4,2	83,0
Sorting	0,98498	9	0,50710	3,2	86,2
Parts of Whole	0,99259	10	0,50301	3,1	89,4
Emotions	0,97319	11	0,46711	2,9	92,3
Attitudes (H)	0,50106	12	0,42459	2,7	94,9
Attitudes (S)	0,46912	13	0,31097	1,9	96,9
Total	0,99997	14	0,26641	1,7	98,5
PPVT	0,43391	15	0,23384	1,5	100,0
DAP	0,42850	16	0,00002	0,0	100,0

TABLE 18.2 COMMUNALITIES, FACTOR GROUPINGS, EIGENVALUES AND PERCENTAGES RESULTING FROM MATRIX USING PRINCIPAL FACTOR WITH ITERATIONS

VARIABLE	COMMUNALITY	FACTOR	EIGENVALUE	% OF VAR	CUM
Body Parts	0,61532	1	5,10382	54,3	54,3
Geometric Forms	0,55289	2	1,52635	16,2	70,5
Identifying	0,58060	3	1,02433	10,9	81,4
Matching	0,59626	4	0,94761	10,1	91,5
Letters	0,59885	5	0,80280	8,5	100,0
Numbers	0,75173				
Relational Terms	0,57572				
Classifying	0,46697				
Sorting	0,49802				
Parts of Whole	0,62757				
Emotions	0,64066				
Attitudes (H)	0,45708				
Attitudes (S)	0,52874				
Total	0,98020				
PPVT	0,44064				
DAP	0,40361				

TABLE 18.3 VARIMAX ROTATED FACTOR MATRIX

VARIABLE	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5
Body Parts	0,77123	0,01501	-0,23860	-0,02116	-0,02546
Geometric Forms	0,17567	-0,14288	0,07015	0,69688	-0,10516
Identifying	0,62474	0,07771	-0,29671	0,21745	-0,22122
Matching	0,72431	-0,12509	0,09420	0,07711	0,20290
Letters	0,20995	-0,07331	0,02311	-0,03514	0,74002
Numbers	0,69716	-0,01148	0,46402	0,04493	0,21960
Relational Terms	0,47731	0,16183	-0,09320	0,52314	0,19834
Classifying	0,61211	0,25970	0,01851	0,15651	0,00158
Sorting	0,31422	-0,10051	0,44881	0,32153	-0,29047
Parts of Whole	0,69641	0,07397	-0,06258	0,36132	0,05135
Emotions	-0,01016	0,55611	0,08617	0,38871	0,41566
Attitudes (H)	0,18909	0,69243	0,13605	0,05833	-0,09974
Attitudes (S)	0,01087	-0,69924	-0,03169	0,19488	0,02667
Total	0,90278	0,03892	0,26296	0,23958	0,19269
PPVT	0,09575	-0,21728	-0,61794	0,01220	-0,04753
DAP	0,45631	0,12600	0,25329	0,31266	0,13266

11.4.3 Control Posttest Data

According to Table 18.2, five factors were extracted after the principal factor method was employed on the control posttest data. Only the first three factors contained common variance and the other two factors contained unique variance. After performing the varimax rotation the tests in each factor clustered together in the following way:

Factor 1 General cognitive skills

The general factor appeared to stem from various subtests with a common variance of 54,3%. Significant loadings occurred on body parts (0,771), matching (0,724),numbers (0,697), classification (0,612), and sorting (0,314), which related strongly to the total subtest score (0,902) and with the DAP (0,456) a measure of non-verbal intelligence. The general factor thus appeared to be a range of cognitive skills which related to non-verbal intelligence.

Factor 2 Emotional Responsiveness

Common variance of 16,2 % was shown by tests on this factor

Attitudes to school, friends and family loaded significantly on this factor with a negative loading on sad attitudes (-0,699) and a positive loading on happy attitudes (0,692). This result indicated that while the happy responses of children were high, sad responses were very low revealing good positive affect in the children tested.

In addition a significant loading appeared on the emotions test (0,556) indicating that children were able to identify and label emotions correctly, a factor which added credibility to the test of attitudes.

In general this factor highlighted the childs perception of emotions and emotional attitudes towards the self, others, school and learning.

Factor 3 Tests employing Negative Verbal Intelligence

Common variance of 10,9% [illegible]ared by tests on this factor.

The PPVT, a test of verbal intelligence had a significant negative loading (0,617) [illegible] related to the sorting test (0,448) and the number test (0,464,, both of which had previously been related to non-verbal intelligence. It thus appeared that verbal intelligence was not a part of the sorting or numbers test.

Factor 4

The tests on this factor contained unique variance, which may have been attributed to specific and error variance. The geometric form test (0,696) appeared to be unique to factor four, whilst the

other tests loaded significantly in other factors. .These tests were relational terms (0,523), parts of whole (0,361), sorting (0.321), emotions (0,388) and DAP (0,312).

Factor 5

Tests on this factor contained unique variance. The letters test with a high loading (0,740) was unique to factor five. The emotions test also had an amount of unique variance although as has been seen previously, it contained common variance in the second factor.

TABLES 19.1, 2 AND 3 EXPERIMENTAL POSTTEST DATA FROM FACTOR ANALYSIS

TABLE 19.1 ESTIMATED COMMUNALITIES, EIGENVALUES AND PERCENTAGES RESULTING FROM CORRELATION OF VARIABLES

VARIABLE	COMMUNALITY	FACTOR	EIGENVALUE	% OF VAR	CUM %
Body Parts	0,93906	1	5,73348	35,8	35,8
Geometric Forms	0,87211	2	2,17889	13,6	49,5
Identifying	0,73376	3	1,35395	8,5	57,9
Matching	0,56868	4	1,22240	7,6	65,6
Letters	0,72427	5	0,89546	5,6	71,2
Numbers	0,99260	6	0,83509	5,2	76,4
Relational Terms	0,74188	7	0,76951	4,8	81,2
Classifying	0,84763	8	0,64710	4,0	85,2
Sorting	0,62316	9	0,54840	3,4	88,7
Parts of Whole	0,66828	10	0,46417	2,9	91,6
Emotions	0,42751	11	0,43124	2,7	94,2
Attitudes (H)	0,81359	12	0,35384	2,2	96,5
Attitudes (S)	0,81732	13	0,26360	1,6	98,1
Total	0,99740	14	0,20529	1,3	99,4
PPVT	0,33270	15	0,09568	0,6	100,0
DAP	0,70944	16	0,00181	0,0	100.0

TABLE 19.2 COMMUNALITIES, FACTOR GROUPINGS, EIGENVALUES AND PERCENTAGES RESULTING FROM MATRIX USING PRINCIPAL FACTOR WITH ITERATIONS

VARIABLE	COMMUNALITY	FACTOR	EIGENVALUE	% OF VAR	CUM %
Body Parts	0,69398	1	5,38974	60,7	60,7
Geometric Forms	0,50853	2	1,95653	22,0	82,7
Identifying	0,55500	3	0,90087	10,1	92,9
Matching	0,34055	4	0,63279	7,1	100,0
Letters	0,59085				
Numbers	0,72672				
Relational Terms	0,35939				
Classifying	0,46661				
Sorting	0,32452				
Parts of Whole	0,40638				
Emotions	0,21403				
Attitudes (H)	0,84537				
Attitudes (S)	0,86608				
Total	0,99486				
PPVT	0,28903				
DAP	0,69800				

TABLE 19.3 VARIMAX ROTATED FACTOR MATRIX

VARIABLE	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4
Body Parts	0,52715	0,16618	0,60484	-0,15046
Geometric Forms	0,58824	0,17979	0,30764	-0,18852
Identifying	0,46568	0,25845	0,51875	0,04742
Matching	0,57393	0,09404	0,04807	0,00064
Letters	-0,08978	-0,16580	0,02025	0,74491
Numbers	0,69006	-0,18518	0,33383	0,32373
Relational Terms	0,57509	-0,01802	0,11633	0,12167
Classifying	0,41783	0,05722	0,53518	-0,04831
Sorting	0,51403	0,05538	-0,02856	-0,23751
Parts of Whole	0,59547	0,17645	0,11970	0,07955
Emotions	0,19343	0,06424	0,04048	0,41334
Attitudes (H)	0,10583	0,91072	0,06135	-0,03149
Attitudes (S)	-0,07384	-0,92476	-0,01570	0,07212
Total	0,85188	-0,02921	0,46502	0,22818
PPVT	-0,00485	-0,05298	0,52233	0,11566
DAP	0,74826	0,08554	0,25635	0,25510

11.4.4 Experimental Posttest Data:

According to Table 19.2 four factors were extracted after the principal factors method was employed on the experimental posttest data. However, only the first two factors contained tests with

common variance, the last two factors containing unique variance. After the varimax rotation was performed the following factor pattern emerged:

Factor 1 General Cognitive Skills

Common variance shared by tests on this factor equalled 60,7%. The configuration of significant loading on this factor was similar to that on factor one of the control posttest scores. The total score loaded highly (0,851) as did the DAP (0,748) indicating that the cognitive skills test was highly related to non-verbal intelligence. Other significant loadings were numbers (0,690), geometric forms (0,588), body parts (0,527), matching (0,573), identifying community members and places (0,465), relational terms (0,575), classification (0,417) and parts of whole (0,595). Thus, this range of cognitive skills was related to the total test score and non-verbal intelligence.

Factor 2 Personal Emotional Attitudes

The amount of common variance shared by tests on this factor was 22,0%. Significant loadings were happy attitudes (0,910) and sad attitudes (-0,924). Thus children responded with high happiness and very low sadness on the experimental posttest. This factor loaded similarly to factor two of the control posttest, to factor three of the control pretests, and to factor one of the experimental pretests. It is interesting to note that whilst these tests formed the primary factor in the experimental pre-test group with the range of cognitive skills being secondary, this priority was changed in the posttest group rendering the cognitive skills factor predominant.

Factor 3

The tests in this factor contained unique variance although all except the Peabody scores showed common variance in factor one. Since the eigenvalue of this factor was close to one, (0,90) there was a possibility that some common variance existed and related to skills exhibiting verbal intelligence properties. Significant loadings occurred on body parts (0,604); identifying community members and places (0,518); classifications (0,535); total score (0,465); PPVT (0,522); geometric forms (0,307) and numbers (0,333).

Factor 4

In this factor letters (0,744), numbers (0,323) and emotions (0,413) showed unique variance although the numbers test exhibited common variance in the first factor. Letters and emotions were, however, unique to factor four.

TABLE 20 SUMMARY OF SIGNIFICANT COMMON FACTORS

	CONTROL PRETEST	EXPER PRETEST	CONTROL POSTTEST	EXPER POSTTEST
COMMON FACTORS	1 Non-Verbal and abstract Reasoning 2 Visual Discrimination 3 Personal emotional attitudes	1 Personal Emotional Attitudes 2 Verbal Intelligence	1 General Cognitive Skills 2 Emotional Responsiveness 3 Tests using Negative Verbal Intelligence	1 General Cognitive Skills 2 Personal Emotional Attitudes

11.4.5 Summary of Factor Analysis Findings:

From the previous results it appears that subtests did not group together consistently into similar factors over the four experimental conditions. However whilst Control and Experimental groups showed different factor patterns, emotional attitudes and responsiveness appeared as common factors in each group. In addition general cognitive skills appeared as factor one in both control and experimental posttest. However, subtests seemed generally to be scattered over all the factors, sharing common variance in some and having unique variance in others. In the Experimental pretest group the numbers test exhibited a high degree of unique variance (high loadings on factors 3, 4 and 5) and the letters test appeared to have high unique variance in all four groups.

In conclusion it appears that subtests cannot be easily grouped for further statistical analysis, but that each test score should be investigated individually. Such an analysis appears in the form of the t-test and Analysis of Covariance which follow.

11.5 Correlation Matrix:

Before t-test and Analysis of Covariance differences are investigated, it should be noted from the correlation matrix of the Control Pretest group (Appendix C2), that none of the subtests correlated highly with the Peabody Picture Vocabulary Test or with the Draw a Person test except for the total of the cognitive skills test which had a correlation coefficient of 0,652 with the DAP. The shared communality of these two tests was 42,53 % which lent support to certain findings of the factor analysis in which measured non-verbal intelligence seemed to load highly with the subtest and total score whilst the PPVT seldom loaded highly and sometimes loaded negatively with the subtests and total score.

TABLE 21 PRETEST AND GAIN SCORES FOR t-TEST COMPARISONS

	No. of Items	Total Score	CONTROL Pretest	CONTROL Gain	EXPERIMENTAL Pretest	EXPERIMENTAL Gain	PRETEST t	PRETEST p	GAIN SCORES t	GAIN SCORES p
Body Parts	20	20	13,61	1,04	14,19	2,27	0,96	0,339	2,62	0,010 xx
Geometric Forms	6	6	1,87	0,31	2,34	1,13	1,68	0,096	2,83	0,005 xx
Identifying	8	8	2,57	-0,16	2,93	0,16	1,13	0,260	1,18	0,241
Matching	4	4	1,37	0,24	1,27	0,59	-0,56	0,574	1,76	0,081
Letters	6	36	1,07	-0,44	0,77	0,13	-1,28	0,202	2,13	0,035 x
Numbers	28	49	18,87	-1,33	20,26	3,54	0,73	0,469	4,84	0,000 xxxx
Relational Terms	8	8	5,44	-0,61	5,69	-0,09	0,73	0,467	1,65	0,101
Classification	6	6	1,81	0,36	1,61	1,21	-0,70	0,486	2,80	0,006 xx
Sorting	3	3	1,03	0,09	1,06	0,34	0,20	0,844	1,41	0,162
Parts of Whole	4	4	1,99	-0,39	2,13	-0,14	0,69	0,493	1,29	0,199
(Ea) Emotions	2	2	1,31	0,13	1,50	0,24	1,58	0,116	0,91	0,366
Attitudes to School (Happy)	8	8	5,96	0,30	5,59	0,73	-0,87	0,386	1,07	0,285
Attitudes to School (Sad)	8	8	1,53	-0,39	1,97	-0,54	1,16	0,247	-0,43	0,671
Total	145	146	50,96	-0,74	53,74	9,53	0,94	0,346	6,98	0,000 xxxx
Peabody			74,41	-0,49	71,54	4,50	-1,31	0,193	3,13	0,002 xx
Draw a Person			4,16	-0,12	4,35	0,38	0,83	0,407	3,90	0,000 xxxx

Key: x - indicates differences significant at the ,05 level of confidence
xx - " " " " ,01 " " "
xxx - " " " " ,001 " " "
xxxx - " " " " ,0001 " " "

11.6 t-Test of Pretest Scores:

A t-test was conducted on the pretest scores of subjects in the experimental and control groups to test whether the random allocation of subjects to these groups was carried out adequately and whether the loss of subjects due to absence from school was similar for both groups.

Results from Table 21 showed that the means of pretest scores of experimental and control groups were not significantly different, and that the two groups were quite similar in all respects at pretest.

11.7 t-Test on Gain Scores:

A t-test was then conducted on the gain scores (posttest minus pretest scores) between the experimental and control groups to demonstrate whether the experimental manipulation was more effective than the control situation. Results from this test are found in Table 21 above.

Results from this test will be discussed along with results of the Analysis of Covariance since both tests demonstrate the same thing. Reasons for using both tests have been presented in chapter 10 above.

TABLE 22 ANALYSIS OF COVARIANCE SCORES COMPARING EXPERIMENTAL AND CONTROL SUBJECTS

TEST	*F	"p	
Body Parts	10,298	0,002	xx
Geometric Forms	12,052	0,001	xxx
Identifying	4,286	0,040	x
Matching	2,803	0,096	
Letters	2,849	0,094	
Numbers	25,626	0,000	xxxx
Relational Terms	4,854	0,029	x
Classifications	7,385	0,007	xx
Sorting	2,911	0,090	
Parts of Whole	3,045	0,083	
Emotions (Ea)	6,278	0,013	x
Attitudes Happy	0,468	0,495	
Attitudes Sad	0,227	0,634	
Total	47,803	0,000	xxxx
Peabody	8,333	0,005	xx
Dap.	17,524	0,000	xxxx

Key: "p - represents the level of significance
x - indicates differences significant at the ,05 level of confidence
xx - indicates differences significant at the ,01 level of confidence
xxx - indicates differences significant at the ,001 level of confidence
xxxx - indicates differences significant at the ,0001 level of confidence
*F - is the ratio $\frac{\text{mean square between groups}}{\text{mean square within groups}}$

11. 8 Analysis of Covariance.

11.8.1 General Effects:

The chief aim of this study was to test whether the experimental treatment of viewing the television programme was successful. In other words, did children in the experimental group perform better than children in the control group on posttesting?

From Tables 21 and 22 above it appears that children in the experimental group performed significantly better on the total of the M-test (at the ,0001 level of confidence) than children in the control group. Since the total score of the M-test provided a collective indication of the improvement in cognitive skills, it appears that cognitive skills were effectively learnt from viewing Bright Rides.

In order to obtain a picture of the specific effects of the television programme on the viewers, a detailed analysis follows. Tables 21 and 22 will be referred to throughout this analysis. Test-retest reliability coefficients which are also constantly indicated are to be found in Appendix C1.

11.8.2 Subtest Effects:

Body Parts

About 2,88% of the show was devoted to the teaching of the names and functions of body parts. The Body Parts test was made up of 20 items which assessed the child's ability to recognise or name parts of the body and functions of body parts. The test-retest reliability coefficient was 0,76 which indicated that the test was a consistent measure from pretest to posttest. From Table 21 the experimental group gained significantly more than the control group

(at the confidence level of ,01), when gains were compared. After covarying pretest scores with posttest scores a similar level of significance was found. (See Table 22.)

It thus appears that body parts were learnt significantly better by children who viewed Bright Rides than by those who did not see the programme.

Geometric Forms

About 1,9% of the programme was spent on teaching geometric forms. The geometric forms subtest was made up of 6 items which assessed the child's ability to name and recognise (point out) geometric forms. The test-retest reliability coefficient was 0,64. From Table 21 the experimental group gained significantly more than the control group (confidence level of 0,01) when simple gains were compared. The significance level increased (0,001) when analysis of covariance was performed, (see Table 11) indicating that geometric forms were taught effectively by the programme.

Identifying Community Members and Places

About 12,99% of 'Bright Rides' dealt with the roles of community members and places in the natural and man-made environment. The subtest for identifying community members and places was made up of 8 items which assessed the child's ability to name and recognise people and places in the childs everyday environment. Test-retest reliability coefficient was equal to 0,74. According to Table 21 a significant difference was not found in the gains between the experimental and control groups, however, when pre-test scores were covaried over posttest scores, a significant difference was found at the 0,05 level of significance. (See Table 22).

A possible reason for the discrepancy between these two test results is that while the control group suffered a small loss in performance (-,16) the experimental group gained slightly (,16), but neither change was significant. However, when pretest scores were covaried the effect was to minimise pretest differences and enhance gain score differences which revealed the abovementioned significant score.

Since ANCOVA is a stronger test of differences than is the simple t-test, it appears that the experimental group did perform better than the control group in identifying community members and places.

Matching Objects

About 2,88 % of Bright Rides dealt with the matching of similar objects. The matching subtest comprised 4 items and assessed the childs ability to match letters, numbers or words by form or size. Test-retest reliability was equal to 0,50. According to Tables 21 and 22 a significant difference was not found in the performance of experimental versus control subjects. It is possible that exposure to this skill in the programme was insufficient for learning to have occurred, or that the test did not comprise enough items to adequately measure this skill. In addition, since the test was only 50% reliable, an accurate measurement of this skill might have been prevented.

Letters

This skill area was heavily stressed during the programme with 23,9% of total programme time being given to naming letters, associating initial letters with words and reciting the alphabet.

This subtest, comprising 6 items assessed the childs ability to recognise and label letters, to recite the alphabet and to name the first letter of a particular word. A maximum score of 36 was possible. According to Table 21 a significant difference was found between experimental and control subjects at the 0,05 level of significance using the t-test. However, the difference was not significant when ANCOVA was performed. (See Table 22).

A possible reason for this discrepancy was that at pretest (see Table 21) children in the experimental group started off at a lower level than did children in the control group (although this difference was not significant), so that although a greater gain was made by the experimental group, it was not sufficient to make up for the pretest difference. ANCOVA corrects for pretest differences and the posttest score that results is thus a true indication of the change that occurred which in this case was insignificant. Nevertheless it is of some interest to inspect the t-test scores to establish in what direction change occurred. It appears that control group children performed worse (albeit minimally) on posttest than on pretest, whilst experimental group children improved from pretest to posttest. Thus it would seem that the programme had some effect on its viewers, in the letter knowledge goal area, although this effect was not significant.

However, caution should be taken in attributing any effect to the programme for its teaching of letter knowledge, since the test used to measure this skill had very low test-retest reliability (r = 0,25) and was thus not a consistent measure from pretest to posttest. Because of this factor, any differences in performance might have been attributed to inconsistencies in testing.

Numbers

This skill area was also quite heavily emphasized with 18,23% of total programme time being spent on labelling and recognising numbers, reciting numbers from 1 to 20, employing different counting strategies and making numerical correspondence between a numeral and a number of objects. The number subtest comprised 14 items with a maximum score of 49 and tested for the skills mentioned aobve. It would have been interesting to analyse individual number subtest scores in this skill area since numerical correspondence for example requires different mental operations than does counting strategies. However, since all other subtests were assessed on a total score, the same method of scoring was employed for this subtest. Test-retest reliability was 0,88.

From Tables 21 and 22 it can be seen that a significant difference ($p = ,0001$) was found between the gains of experimental and control subjects on the t-test and on ANCOVA and thus viewing the programme seems to have had a beneficial effect on number skill achievement.

Relational Terms

This skill area comprised 9,53 % of programme time. Relational terms acquisition was assessed by asking the child to select a picture in which a relationship of size, quantity or position was depicted. For example, a child had to indicate the biggest or the smallest object for size relationships, and many or few objects for relationships of quantity. Relational terms dealing with position required that the child indicate the first or last item, the farthest or nearest object and whether elements of a picture were between, around, on top of or under others. The subtest was made up of 8 items. Test-retest reliability was 0,57.

According to Table 21 it appears that the difference between experimental and control groups was not significant when simple gains were compared. However, after covarying pretest scores, the difference in posttest scores was found to be significant at the 0,05 level of significance. (See Table 22).

The difference in test results may be explained as follows:

It appears from Table 21 that both groups suffered a loss in scores on posttesting (negative gains) but that the decrease was smaller in the case of the experimental group. After covarying pretest scores, a significant difference emerged which was not detected on a simple gain score comparison. It should be noted however, that since both groups suffered a drop in performance on posttesting, it may be incorrect to assume that the programme had a positive effect in teaching relational terms, for although a significant difference was found between the two groups, both groups deteriorated whether they had seen the programme or not. The drop in performance found in both groups may however, have been caused by inconsistencies in the testing,since reliability was only moderate.

Classifying

Bright Rides spent 6,44% of total time in teaching this skill area, in which a child or puppet presenter placed objects into categories according to common properties of the objects. The test included 6 items and required that the child choose a picture that had one property in common with two other pictures (double classification). Test-retest reliability was 0,60 for tests of classification.

According to results from Table 21 and 22, a significant difference ($p = 0,01$) was found in simple gain scores and in posttest scores

after covariance with pretest scores, when experimental and control groups were compared. It thus appears that the programme was effective in teaching skills of classification.

Sorting

About 4,33% of the programme was spent on this skill area showing the child how to sort an array of mixed pictures into a meaningful sequence, and how to find an unsuitable object in a set of objects. The subtest was made up of 3 items. The child was asked to select the objects that did not belong with others and to explain the choice of that object. Test-retest reliability was 0,34.

According to Tables 21 and 22 a significant difference was not found in simple gain scores or on posttest scores after covariance with pretest scores, when experimental and control groups were compared. It thus appeared that the programme was not effective in teaching sorting. However, it was also possible that whilst the programme was effective, the test was not adequate to test the skill since it was made up of only 3 items. In addition the reliability coefficient was relatively low indicating that the test did not measure consistently from pretest to posttest.

Parts of Whole

This goal area comprised about 1,31 % of the programme and usually showed a child making an object out of individual parts. On assessment, the child was expected to select an object that could be made from a set of parts presented to him. The test-retest reliability coefficient was 0,66.

According to Tables 21 and 22, a significant improvement was not achieved in this area. In fact children in both control and experimental groups performed worse on posttest than on pretest. It was possible that the programme did not teach this skill effectively, or that exposure to this goal area was too short. Thus it might be necessary to investigate new ways in which to teach parts of whole in future. In all events, the learning of parts of whole was not affected by the viewing of Bright Rides.

Emotions

This skill comprised about 1,46% of total programme time and presented the viewer with items involving the recognition and labelling of emotions. The subtest of 2 items assessed the childs ability to choose the appropriate emotions (happy or sad) for specific situations. Test-retest reliability was 0,40.

According to Table 21, no difference was found between experimental and control subjects when gain scores were compared. However, after covarying posttest scores with pretest scores, a significant difference was found between the two groups at the 0,05 level of significance. (See Table 22). Thus scores on ANCOVA indicate that viewing the programme had a significant effect on the recognising and labelling of emotions. However, since the reliability coefficient of this test was relatively low, this effect should be treated with caution.

Attitudes to School and to Others

The programme allocated 3,62 % of total time to attitude evaluation. Segments of Bright Rides showed presenters pointing

out attitudes towards themselves, and others, and children, and adults in social interactions. The attitude assessment required that the child say that he was happy or sad when for example, he went to school, recited the alphabet, or played with friends. Test-retest reliability was 0,45 for happy attitudes and 0,32 for sad attitudes.

According to Tables 21 and 22, a significant difference was not found between experimental and control subjects when attitudes to school were measured. Table 21 showed that both control and experimental group "happiness" increased slightly from pretest to posttest and that the "sadness" of both groups decreased. It thus seemed that the intervention, which took the form of testing or the showing of Bright Rides had a positive effect on the children. Thus the fact that children were tested, or that interest was taken in them might have been as important as was the showing of the television programme in order to improve their attitudes to themselves, to school and to others.

Peabody Picture Vocabulary Test (PPVT)

The PPVT was administered to gain a measure of verbal intelligence of the sample under study. The test was administered on pretesting as well as on posttesting to see if television intervention had an effect on the "brightness" of children as measured by vocabulary knowledge. Test-retest reliability was found to be 0,83 on this test. From Table 21 it appears that while the performance of control children on the PPVT dropped by 0,49 points, the performance of experimental children increased by 4,5 points. This difference was significant at the 0,01 level of significance. Similarly,

after covarying pretest scores a significant difference ($p = 0,01$) was found between the posttest scores of experimental and control subjects. (See Table 22). It thus appears that a programme such as Bright Rides can affect the measured verbal intelligence of pre-school children, possibly since it introduces a variety of new words into the child's vocabulary.

The Draw a Person Test (DAP)

According to Table 21 and 22, a significant difference appeared in measured non-verbal intelligence scores between experimental and control groups.

From Table 21, it appears that the control group dropped by 0,12 points and the experimental group increased by 0,38 points between pretest and posttest. Whilst neither the decrease or increase appeared to be significant, the difference on gain scores was significant (at the 0,0001 level of confidence). A significant difference occurred on posttest scores after ANCOVA was performed indicating that Bright Rides had a positive effect on the measured non-verbal intelligence of preschool children. Another possible reason for the improvement in DAP scores was that the drawing ability of the viewing sample might have improved, since in watching Bright Rides, they could have learned new physical features from the body parts sequences.

11.8.3 Summary of Experimental and Control Group Results:

Having looked at 12 skill areas of Bright Rides and two measures of intelligence - one verbal and one non-verbal, the following general effects emerge. Bright Rides seemed to have strong positive

effects in some areas, lesser positive effects in others, and no apparent effects with the remaining skills. In summary, those sub-tests where gains between the experimental and control groups appeared:

1) to be clearly and significantly greater, were body parts, geometric forms, numbers, classifications, Peabody Picture Vocabulary and Draw a Person Test.
2) to be greater but the evidence was not as strong were identifying community members and places, relational terms and emotions. Concerning relational terms, it should be noted that whilst the difference between experimental and control groups was significant, both groups suffered a slight loss on posttest performance. Since the loss was smaller on the experimental group, Bright Rides appeared to have a very small positive effect on the acquisition of relational terms.
3) not to be greater were matching, letters, sorting, parts of whole, attitudes to self, others and school.

11.9 Effects of Five Independent variables on viewing and non-viewing of Bright Rides:

In the last section, the data were analysed in terms of the experimental versus control manipulation and the effects of this treatment were presented.

In this section, the data obtained will be re-examined for effects due to specific independent variables such as child-care centre groups, age groups, sex groups, language groups or televiewing groups. These effects are examined separately for the control group

and for the experimental group.

Since one aim of this study was to ascertain whether certain children who viewed Bright Rides learnt more than others, the experimental group results are of particular importance. In the Analysis of Covariance data discussed below, main effects and interaction effects are indicated and thus the rationale for these effects will be discussed first.

A main effect occurs when a specific independent variable affects the scores, to the exclusion of other factors. For example males may benefit more than females from watching a television programme. An interaction occurs when the effect for a factor is different for different levels of another factor (McCall 1970). For example the age of the child may depend on or interact with the sex of the child. A male four year old may benefit more than a male three year old from viewing a television programme, whilst females of either age group might not benefit from viewing the programme at all.

McCall (1970) notes that the interaction of two main effects may have the same effect as the combination of two chemical elements, often producing a result which could not have been predicted on the basis of knowing the separate effects of each chemical. In the same way a statistical interaction results in an unpredictable effect. According to this rationale, a general rule has been established which states that when an interaction effect occurs, one generally ignores the significance or insignificance of the main effects. (McCall 1970).

The exception to this rule occurs when an interaction exists, but all levels of one group are significantly higher than the corresponding

levels of the other group. This analysis yields an important main effect and an important interaction.

In the present study each independent variable was treated separately. For example the analysis indicated whether males performed better than females, and whether five year olds performed better than three year olds. However, it did not show whether male five year olds performed better than male three year olds or than female three year olds. In this situation the following rule applies. When the F score of the main effect is greater than the F score of the interaction - the main effect overrides the interaction. However, if the interaction F score is greater than the F score for the main effect, the interaction may be causing one of the main effects to remain significant when it is not necessarily true for that particular group. In this case the main effect is disregarded (Shmukler 1978).

The results for children grouped by each independent variable may be found in the following tables.

Table 23 presents a summary of Analysis of Covariance scores for control group subjects showing main effect F values and significance levels for each new test when subjects were grouped according to child-care centre group, sex group, age group, language group and televiewing group.

Table 24 shows a summary of Analysis of Covariance scores for experimental group subjects with main effect values and significance levels presented for each subtest when subjects were grouped according to the abovementioned independent variables.

TABLE 23 Analysis of Covariance for Control Subjects (Main Effects)

Independent Variables: Child Care Centre differences, sex differences age differences, language differences and televiewing differences
Dependent Variables : Posttest scores of each subtest
Covariates : Pretest scores of each subtest

Test		Total	Child Care Centre	Sex	Age	Lang.	TV
Body Parts	*(F)	1,628	1,048	0,053	2,636	3,009	0,100
	"(p)	0,160	0,364	0,820	0,089	0,065	0,754
Geometric Forms	(F)	1,785	0,405	0,452	3,666	0,934	3,278
	(p)	0,121	0,671	0,506	0,038	0,405	0,081
Identifying	(F)	0,240	0,183	0,000	0,343	0,305	0,765
	(p)	0,980	0,833	0,984	0,713	0,740	0,389
Matching	(F)	1,888	1,098	3,220	2,986	0,191	0,000
	(p)	0,101	0,347	0,083	0,066	0,827	0,991
Letters	(F)	2,359	2,045	0,117	3,194	5,591	0,030
	(p)	0,043	0,148	0,735	0,056	0,009	0,864
Numbers	(F)	0,880	0,070	0,020	1,235	0,837	1,531
	(p)	0,545	0,933	0,888	0,306	0,443	0,226
Relational Terms	(F)	0,174	0,168	0,248	0,164	0,169	0,044
	(p)	0,993	0,846	0,623	0,849	0,845	0,836
Classifying	(F)	0,825	1,193	0,030	1,466	0,459	0,136
	(p)	0,587	0,318	0,863	0,247	0,636	0,715
Sorting	(F)	1,714	1,279	0,040	1,264	2,386	0,085
	(p)	0,137	0,294	0,843	0,298	0,110	0,773
Parts of Whole	(F)	1,789	1,299	0,002	3,039	0,636	1,475
	(p)	0,120	0,288	0,964	0,063	0,537	0,234
Emotions (ea)	(F)	1,233	2,166	0,474	1,976	0,121	0,002
	(p)	0,316	0,133	0,496	0,157	0,887	0,965
Attitudes Happy	(F)	2,661	4,957	0,968	0,693	0,637	0,153
	(p)	0,025	0,014	0,333	0,508	0,536	0,698
Attitudes Sad	(F)	3,021	8,030	2,004	2,589	1,215	0,277
	(p)	0,014	0,002	0,168	0,092	0,311	0,603
Total (Mt)	(F)	0,767	0,424	0,031	0,261	1,403	1,938
	(p)	0,634	0,658	0,862	0,772	0,262	0,174
Peabody	(F)	1,358	0,169	0,330	0,735	3,398	0,632
	(p)	0,256	0,846	0,570	0,488	0,047	0,433
Dap.	(F)	0,644	0,379	0,933	1,407	0,112	0,255
	(p)	0,735	0,688	0,342	0,261	0,895	0,617

*F is the ratio $\frac{\text{mean square between groups}}{\text{mean square within groups}}$
"p represents the level of significance
Underlined p scores indicate a 0,05 level of significance of the corresponding F ratio

TABLE 24 Analysis of Covariance for Experimental Group Subjects (Main effects)

Independent Variables: Child Care Centre differences, sex differences age differences, language differences and televiewing differences
Dependent Variables : Posttest scores of each subtest
Covariates : Pretest scores of each subtest

Test		Total	Child Care Centre	Sex	Age	Lang.	TV
Body Parts	*(F)	2,890	2 6	2,834	6,077	0,603	0,012
	"(p)	0,015	0,101	0,102	0,006	0,553	0,914
Geometric Forms	(F)	2,788	1,527	0,015	5,393	0,403	6,033
	(p)	0,018	0,233	0,902	0,010	0,672	0,020
Identifying	(F)	3,065	2,255	1,343	11,025	0,179	0,063
	(p)	0,011	0,121	0,255	0,000	0,837	0,804
Matching	(F)	1,889	0,631	0,285	3,868	2,281	0,717
	(p)	0,097	0,539	0,597	0,031	0,119	0,403
Letters	(F)	0,440	0,229	0,172	0,409	0,491	0,095
	(p)	0,888	0,796	0,681	0,668	0,616	0,760
Numbers	(F)	0,693	0,168	0,040	2,059	0,130	0,537
	(p)	0,695	0,846	0,843	0,144	0,878	0,469
Relational Terms	(F)	2,490	2,234	0,765	4,822	1,800	0,126
	(p)	0,032	0,123	0,388	0,015	0,182	0,725
Classifying	(F)	0,695	0,420	0,294	1,053	0,686	0,318
	(p)	0,693	0,660	0,592	0,361	0,511	0,577
Sorting	(F)	1,575	0,680	0,632	2,098	1,460	1,144
	(p)	0,172	0,514	0,432	0,139	0,247	0,293
Parts of Whole	(F)	1,817	0,452	0,683	1,229	4,209	0,002
	(p)	0,110	0,640	0,415	0,306	0,024	0,964
Emotions (Ea)	(F)	0,508	1,097	0,079	0,390	0,337	0,888
	(p)	0,841	0,346	0,780	0,680	0,717	0,353
Attitudes Happy	(F)	0,245	0,244	0,044	0,128	0,665	0,004
	(p)	0,979	0,785	0,834	0,880	0,521	0,952
Attitudes Sad	(F)	0,249	0,396	0,095	0,021	0,663	0,001
	(p)	0,977	0,676	0,760	0,980	0,522	0,979
Total (Mt)	(F)	0,925	0,483	0,133	1,678	0,733	0,243
	(p)	0,510	0,621	0,718	0,203	0,489	0,625
Peabody	(F)	3,071	3,367	0,615	0,918	1,957	0,013
	(p)	0,011	0,047	0,439	0,410	0,158	0,909
Dap	(F)	0,802	0,057	0,909	2,012	0,421	1,664
	(p)	0,606	0,944	0,348	0,150	0,660	0,206

*F is the ratio mean square between groups / mean square within groups
"p represents the level of significance
Underlined p scores indicate a 0,05 level of significance of the corresponding F ratio

Appendices B1.1, B1.2, B2.1, B2.2 and B3 present the means of pre-test and posttest scores for each subtest when subjects are grouped according to each independent variable in both control and experimental groups.

Appendix B4.1 to B4.16 presents detailed tables of Analysis of Covariance for each subtest in which interaction effects are shown.

Child-Care Centre Differences

In general, differences in child-care centres did not affect most scores, but significant differences did occur on a few subtests and these will be discussed more fully below.

According to Table 23 a significant difference was found between the child-care centres for the attitudes test on the control sample. On inspecting the means of "Attitudes happy" and "Attitudes sad" - in Appendix B1.1 it appears that at pretest the level of happiness was similar for all three groups (Jubilee = 5,84, Dorkas = 5,83 and Holy Rosary = 6,23) although the score was slightly higher for the Holy Rosary Nursery School. Similarly the levels of sadness at pretest for all three schools were very close. However, on posttesting, happy attitudes increased significantly at Holy Rosary, (Jubilee = -0,60, Dorkas = 0,47, H.R. = 1,13) and sad attitudes decreased significantly more at the Holy Rosary Nursery School than at the two crèches. (Jubilee = 0,40, Dorkas = 0,44 and H.R. = -1,23).

According to Appendix B4.12 significant interaction effects were found between centres, ages and languages on the happy attitudes test and so child-care centre differences should be disregarded for this test. However, the main effect overrode the interaction effects on the sad attitudes test (B4.13) indicating that centre differences were indeed important

here. It thus appears that the simple intervention of testers into the child's school environment at Holy Rosary Nursery school had a significant positive effect in children's attitudes towards themselves, others and school since attitude scores decreased significantly. Sadness scores also dropped slightly at Dorkas crèche, but the opposite effect occurred at Jubilee crèche where happiness decreased slightly and sadness increased slightly.

A possible reason for the marked difference in sad attitudes between the Holy Rosary Nursery School and the crèches was that children at this school generally came from a lower class group (see Table 2 who had probably experienced less adult intervention than had their peers at Dorkas (who came from higher class families) and thus that the introduction of extra interested adult (the testers) into their sphere might have had a greater effect in enhancing their attitudes to themselves, school and others than it had for children at Dorkas. For this reason, a control group who did not see Bright Rides, but who received the attention of interested adults should have been included in the study. Sad attitudes did not decrease significantly in any particular child-care centre among the experimental group but the effects of viewing Bright Rides might have masked the effects that interested adults had on the viewing sample.

Although a difference on the attitudes test was not found in the experimental group, a significant difference was found on the Peabody scores in this group. Significant interaction effects were found between crèche differences and other variables on the Peabody Picture Vocabulary Test (B4.15) and so the main effects are of considerable importance.

Whilst children at the three centres appeared to have performed

similarly at pretest level, their posttest scores were considerably different. According to Appendix B1.1 after viewing the programme, children in Jubilee crèche improved considerably (by 7,91 points), children in Dorkas crèche improved to a lesser degree (by 5,09 points) but children at the Holy Rosary Nursery School did not improve at all but rather deteriorated (by 1,88 points).

Thus the viewing of Bright Rides served to improve scores of measured verbal intelligence at the two crèches, whilst it had a slightly negative effect on PPVT scores of children at the Holy Rosary Nursery School. The positive increment noted at the two crèches might be attributed to the fact that cognitive skills which are related to verbal intelligence were not taught adequately at these crèches, such that, Bright Rides became an important stimulant of verbal intelligence in the absence of other instruction. The negative increment in Peabody scores at the nursery school would indicate that the programme did not stimulate the children to greater verbal efficiency at this centre. It appears that perceptual tasks and cognitive training were consciously taught through the medium of play to children at this school. Thus Bright Rides might have been less effective in improving cognitive skills and verbal intelligence than were the activities already in practice. The fact that the negative score was not a large one indicated that the programme, while not improving verbal intelligence scores, did not seriously impede cognitive development.

Sex-Differences

According to Tables 23 and 24, the sex of the child did not have a significant effect on the score of any subtest in both control and

experimental groups.

Age Groups

According to Tables 12 and 13, age was a significant variable in the difference scores of geometric forms for both control and experimental groups. However, (according to Appendix B4) interaction effects were found between sexes, ages and languages for the control group and between centres, sexes, ages and languages for the experimental group, indicating that the effects of age were not significant in affecting scores on the geometric forms test.

In general age differences did not significantly affect the performance of children who viewed Bright Rides however age was a significant variable in the experimental group on the following subtests; body parts, identifying, relational terms, and matching (see Table 23), although, significant interaction effects, found on the body parts and identifying subtests eliminate the main effects of age on these subtests- (Appendix B4.1 and B4.3). Nevertheless, interaction effects were not found ween other variables on the relational terms (Appendix B4.7) and matching subtests (B4.4) indicating that age was influential in the variation of these scores.

On the relational terms test, the four to five year olds improved slightly (by 0,31 points) after watching Bright Rides, but scores of youngest and oldest children deteriorate (by -0,92 and -0,05 respectively) (see Appendix B2.1). It is possible that the attention span of the younger children was shorter than that of the older age groups accounting for the drop in scores of the youngest group, however since the oldest group also deteriorated (although

minimally) it is possible that the relational terms sequences did not provide sufficient stimulation for the children. Furthermore, the older children might have been facing the transition in cognitive stages from pre-operational thought to concrete operations during which time a regression to more egocentric thinking occurs (Piaget 1962). During this transition the child becomes so absorbed in his new logical powers that he concentrates on isolated incidents at the expense of recall of the whole sequence. (Noble 1975),

On the matching test all three age groups seemed to have improved equally, although the gain by the oldest group was significantly larger (0,80 points) than the gain by the youngest group. (0,16 points) (see Appendix B2.1). It would seem that the oldest group benefited most from the programme on this test because of their longer attention span.

Language Differences

Since the television programme was presented in English, it was considered important to note whether English speaking children would perform better than their Afrikaans speaking peers on testing. The tests (cognitive skills (M-test), Peabody (PPVT) and Draw a Person Test (DAP) were administered in English or Afrikaans according to the language preference of the child.

According to Tables 12 and 13, language differences did not have a significant effect on the scores of most subtests however, significant differences appeared on the letters subtest and PPVT scores of the Control Group and on the Parts of Whole test of the experi-

mental group. Since significant interactions were found between sexes and languages on the letters test, and between child-care centres, ages and languages on the Peabody Picture Vocabulary Test, the main effects of languages should be disregarded on the control group. However no interaction effects occurred on the parts of whole subtest on the experimental group, and language differences appeared to have affected these scores. It appears that the scores of both language groups deteriorated after the children had viewed Bright Rides, but that the negative increment was much greater for Afrikaans speakers (-0,14 points) than for English speakers. (-0,07) see Appendix B2.2. It is also worth noting that a significant difference was not found between experimental and control groups on the parts of whole subtest, and that the overall effect of the programme on this subtest has been negative.

Television Viewing Differences

Children were divided into two groups. Those who saw television regularly (three or more times a week) and those who never or rarely saw tlevision (twice or less than twice a week).

According to Tables 23 and 24 television viewing differences did not significantly affect most scores however, a significant difference was found on geometric forms scores in the experimental group when ANCOVA was performed. No interaction effects were found, thus televiewing differences exerted a significant effect on these scores. It appears that children who viewed television regularly, improved significantly more (by 1,37 points) than children who were not regular televiewers (0,67 increase) on the geometric forms test after viewing the present programme Bright Rides. (Appendix B.3).

According to Salomon (1974), children who have seen television programmes regularly will be media literate and will thus be better able to benefit from any other television programme. It appears that those children who rarely or never saw television also benefitted from Bright Rides, but to a much smaller degree.

11.9.1 Summary of Independent Variables Effects:

In summary, the effects that different creches, sexes, ages, languages, and televiewing habits had on the scores of children in control and experimental groups, were the following:

On the control group subtests which appeared to be affected by an independent variable were-

a) Sad attitudes by crèche differences

On the experimental group those sub tests that were affected by an independent variable were-

1. PPVT scores by crèche differences
2. Relational terms and matching by age differences
3. Parts of Whole by language differences
4. Geometric forms by televiewing differences

11.10 Summary of all the results:

The major results of this study may be summarised in the following:

After Content Analysis was performed it was found that numbers and

letters accounted for 42% of programme time. About 32% of programme time was spent on body parts, geometric forms, relational terms, classifying, sorting, parts of whole, emotions, attitudes toward self and others and other skills involved in perceptual discrimination. Identifying community members and places was treated almost 13% of the time and the remaining 13,21% was devoted to entertainment - which was an important component of the programme.

After factor analysing the four groups of scores, Control pretest, Control posttest, Experimental pretest and experimental posttest, it was found that subtests could not be easily grouped into factors for further statistical analysis, but that each test should be investigated individually.

Consequently an analysis of individual subtests was conducted using the t-test for independent samples and the Analysis of Covariance. Seventy children were allocated to an experimental group and another seventy to a control group to see if those children who viewed the programme (experimental) performed better on posttesting than those children who did not see the programme (control).

The following is a summary of these results.

1) At pretest level there were no systematic differences in individual test scores between experimental and control group children.

2) At posttesting children in the experimental group performed significantly better on the total of the cognitive skills

(M-test) than children in the control group. Those subtests which showed significant differences in favour of the experimental group were: body parts, geometric forms, numbers, classification, identifying community members and places, relational terms, emotions, Peabody Picture Vocabulary Test and Draw a Person Test.

Since scores were quite similar on pretesting yet quite divergent on posttesting, it is possible to attribute differences in scores from pretest to posttest to the viewing of Bright Rides.

To ascertain whether Bright Rides had a greater effect on certain children than on other, the scores of children in the experimental group were investigated for child-care centre differences, sex, differences, age differences, televiewing differences and language differences. It was found:

1) that children in Jubilee and Dorkas crèches improved considerably on PPVT scores indicating an increase in verbal intelligence after watching Bright Rides, whilst children at Holy Rosary deteriorated slightly on PPVT scores:

2) that male and female children performed equally on all subtests;

3) that oldest children learnt most and youngest children learnt least on matching, although the middle group learnt the most on relational terms whilst the youngest and

oldest age groups deteriorated slightly:

4) that on the parts of whole test Afrikaans speaking groups appeared to deteriorate more than the English speaking groups:

5) that regular televiewers performed better than rare televiewers on the geometric forms test.

Although these independent variables had an effect of the abovenamed subtests, the general result indicated that most children benefitted from viewing Bright Rides irrespective of the child-care centre the child attended, or his age, sex, language, or amount of televiewing.

In the next chapter these results will be discussed in terms of the foregoing theoretical introduction.

CHAPTER 12

DISCUSSION

It is now necessary to answer the questions asked in Chapter 8 above in order to comprehensively evaluate Bright Rides.

12.1 The First Question

Was the television programme Bright Rides educative and entertaining?

An answer to this question can neither be totally objective nor absolute. In addition this question cannot be answered statistically but rather qualitatively and from subjective observation. The producer set out to design a programme containing personally perceived entertaining and educative elements such as humour and music, and sorting and number skill presentations. However, it was realised that qualities of humour and education differ from producer to producer, from educator to educator, from viewer to viewer and from producer to viewer. For instance, what is considered amusing to the adult producer need not necessarily be entertaining to the pre-school viewer.

12.1.1 Entertainment:

Noble (1975) has noted that producers often conceive of the young child as an adult who will appreciate adult humour and jokes; yet this humour is usually lost on the young televiewer.

The producers of Sesame Street, however, contend that slapstick and other forms of humour are understood by young children and should be included in education programmes to show how nonsensical the world can really be (Lesser 1972, Palmer 1974).

This controversy with regard to entertainment provides an interesting point for discussion. For instance, do short segments, slapstick and so on have appeal to Coloured children in South Africa? In a number of studies it has been shown that humour and entertainment differ from culture to culture (Catell & Goldstein 1977, Handelman and Kapferer 1972, Shultz 1976, 1977, Dieuzide 1974). However the humour of the Coloured people and their children has not been researched in any acceptable degree of detail and as such empirical guidelines to assess relevant humour or entertainment levels were unavailable for the present study. Thus the onus was on the producer to choose certain entertainment techniques and to observe whether these provided appeal. According to the content analysis cognitive skills which occupied most programme time were presented through the use of entertaining devices such as slapstick, humour, surprises incongruities, trickery, rhyming, diversity and so on, whilst the rest of programme time was spent solely on entertaining interludes and sketches.

However, the question to ask is whether the viewing children perceived the programme as entertaining? Perhaps the extent of their involvement in Bright Rides was an indication of the programmes entertainment potential.

According to Palmer (1974), the activity eliciting potential of television programmes is an important indicator of the enjoyment and teaching potentials of these programmes. In the present study the producer (and researcher) was present at all "showings" of Bright Rides and noted that the children sang with the presenters, laughed at the funny characters, repeated letters of the alphabet and numbers after hearing and seeing them presented, and commented excitedly when they had made toys like those indicated in the

programme. They also greeted the arrival of the television set with joy and excitement and would start singing the signature tune of the programme before the television set was connected up.

In addition, the supervisors of the day-care centres, reported that the children spoke about what they had seen after each viewing, and eagerly awaited the next programme. Thus Bright Rides appears to have been entertaining. Whilst more rigorous research could have been conducted to ascertain entertainment levels, the programme nevertheless seemed to provide a happy experience for these children.

A few comments by an assortment of adult viewers indicate how appeal and interest might have been increased. More use could have been made of music, for instance, in identifying popular characters, or for dramatic effect. Popular puppets like Humpty Dumpty could have appeared more regularly since they excited the children's interest. Animation which fascinated the viewers should also have appeared more frequently, however, this technique was restricted since limited studio facilities made it a fairly time-consuming and clumsy filming technique.

12.1.2 Education:

The present producer also set out with particular education goals in mind such as the teaching of number and letter recognition and the ability to sort objects into discrete categories. However, these goals, whilst considered educative by some are felt to be retrogressive by others. For example, Bogatz and Ball (1971) note that the acquisition of cognitive skills is necessary to prepare

every child for school. Letter recognition facilitates prereading, and number recognition lays the foundation for arithmetical manipulations.

However as indicated in Chapter 5 it might not always be desirable to educate a child toward school learning. As early as 1903 Bernard Shaw said "the only time my education was interrupted was when I was in school" (p 79) and Bertrand Russel (1928) noted that (formal) education has become one of the chief obstacles to intelligence and freedom of thought". (p 160).

In addition contemporary progressive educators like Rogers (1969), Holt (1962), Illich (1970), Leonard (1968), and Ginsberg (1972) maintain that we should not be educating our children towards school readiness since the schools thwart real learning.

The reason why schools seem to have failed in their educative purpose, according to Olson and Bruner (1974) is that they teach knowledge which is out of context through media which are primarily symbolic. In addition the nature and development of ability are overlooked since knowledge is the major focus of instruction. Whilst schooling seems to be changing towards a new focus on the process of education rather than its product, schools continue to be knowledge oriented.

Rogers (1969), Toffler (1970), Illich (1970), and many others maintain that learning should leave the schools and take place in the community. Children should learn about the natural and man-made environment in these surroundings and not while in school buildings from the print in books.

Although the present author agrees completely with the sentiment of "deschooling" society, schools still exist and children are still required, in most schools to adhere to an established

every child for school. Letter recognition facilitates prereading, and number recognition lays the foundation for arithmetical manipulations.

However as indicated in Chapter 5 it might not always be desirable to educate a child toward school learning. As early as 1903 Bernard Shaw said "the only time my education was interrupted was when I was in school" (p 79) and Bertrand Russel (1928) noted that (formal) education has become one of the chief obstacles to intelligence and freedom of thought". (p 160).

In addition contemporary progressive educators like Rogers (1969), Holt (1962), Illich (1970), Leonard (1968), and Ginsberg (1972) maintain that we should not be educating our children towards school readiness since the schools thwart real learning.

The reason why schools seem to have failed in their educative purpose, according to Olson and Bruner (1974) is that they teach knowledge which is out of context through media which are primarily symbolic. In addition the nature and development of ability are overlooked since knowledge is the major focus of instruction. Whilst schooling seems to be changing towards a new focus on the process of education rather than its product, schools continue to be knowledge oriented.

Rogers (1969), Toffler (1970), Illich (1970), and many others maintain that learning should leave the schools and take place in the community. Children should learn about the natural and man-made environment in these surroundings and not while in school buildings from the print in books.

Although the present author agrees completely with the sentiment of "deschooling" society, schools still exist and children are still required, in most schools to adhere to an established

curriculum. Thus, although it was considered important to take cognizance of school readiness requirements in the production of Bright Rides, nonetheless the central focus of this programme, was an emphasis on the process of education, namely in the encouragement of cognitive abilities rather than the learning of a series of isolated and possibly meaningless facts. It was also hoped that an entertaining television programme would introduce the child to school subjects through happiness and excitement.

Cognitive skill encouragement was also considered vitally important for the disadvantaged child whose incompetence is quickly perceived in the structured school situation. Feuerstein (unpublished lecture June 1978) has noted that children need to be introduced to cognitive structure through the intervention of a mediator. However, the disadvantaged child who has never had mediated learning experiences suffers when plunged into a school situation which requires that he use these cognitive skills. It was thus hoped that in the absence of other mediation, a televisi programme like Bright Rides would to some extent help to bridge the gap of cognitive deficit thus decreasing his disadvantage.
In attempting to achieve such cognitive mediation eighty per cent of programme time was spent teaching cognitive skills.

12.1.2.1 Cognitive Skills for the Preschooler:

Schermann (1966) has suggested that activities involving perceptual discrimination and conceptualising are the most essential tasks in the encouragement of mental development. Conceptualising requires a foundation in the use of the five senses necessary for

perception, but also requires that the child free himself of perceptual support in order to cope with ideas and propositions. Language becomes necessary to allow labelling, communicating, questioning and creating which are all functions of complex conceptualising. Thus Bright Rides include tasks of perceptual discrimination, such as the identification of tastes and smells, selection of an object which differs from a class of similar objects due to differences in size, function, type or number, and the matching of similar objects. More complex conceptualising included an identification of spatial, temporal, size and quantity relationships and the understanding that the separate parts of an object go to make up the whole. Number identification was also presented to encourage the development of logical and arithmetical operations (Piaget 1952),and letter knowledge was introduced to stimulate prereading and language development. Emotional stimulation was also included to encourage the expression of emotions and positive self image and self confidence. Whether children actually learnt cognitive skills from viewing Bright Rides is discussed in answer to the following question.

12.2 The Second Question

Was there a significant difference in scores on the cognitive skills test (M-test) between children who saw the programme Bright Rides (experimental group) and children who did not see the programme (control group)?

The answer to this question is that Bright Rides was effective in teaching cognitive skills as was seen in the total test score and in many of the subtests. Out of twelve subtests, the programme appeared to make a significant impact on seven cognitive skills and on two indicators of intelligence, whilst no impact was made on four cognitive skills measures and the attitude test. This result is

highly satisfactory in the early stages of formative research since it indicates that Bright Rides, while having the potential to instruct has room for improvement. Formative research of this nature allows for modifications and improvements of the programme and also indicates the most efficient ways to test learning from the televised show.

12.3 The Third Question

On which subtests did most learning take place?

The subtests where statistically significant effects were obtained were:- naming and recognising body parts, naming geometric forms, recognising numbers, identifying community members and places, recognising emotions, classifying objects and identifying relational terms. Bright Rides was however not effective in raising scores on tests of the matching of similar stimuli, naming and recognising letters, parts of whole, sorting out odd objects and attitudes towards the self, others and school.

In order to interpret these results it must be remembered that limits of scope and difficulty were being experimentally probed in the production of Bright Rides. Thus some of its educational goals proved very worthwhile (such as the naming and recognising of body parts) while others were possibly too ambitious (such as the naming and recognising of letters. It is also important to note that whilst performance on certain skills improved significantly after children had viewed the programme, mastery was not achieved in any particular skill area. This does not detract from the research findings. Gross (1973) notes that the presentation of visually projected images of actions requiring performance in the symbolic mode will not instil mastery or competence in the viewer, and Bogatz and Ball (1971) contend that mastery learning is rare in any educational programme

since competence will be achieved only by extensive and continual action of the skill by the individual. Bright Rides did not however set out, to teach all viewers how to classify objects exactly into discrete categories. Nor did it expect to teach all children how to count perfectly from one to twenty. It tried however to introduce these concepts to children and make some learning impact, and in many instances it was successful in doing so. Bright Rides was also not viewed as the only means which the children would have throughout their educational careers of achieving mastery in the established goal areas. It was simply seen as an impetus to interest children in a range of learning possibilities. Thus even though gain scores did not indicate high attainment levels, they showed that some educational impact had been made.

In view of these interpretive cautions, it is interesting to examine whether significant gains were made on skills which were presented more often than others. It is an aphorism of teaching methodology that the greater the extent of exposure to a modelled skill the greater the amount of learning, if learner characteristics and model characteristics are kept equal. (Packard 1975). In this study geometric forms, numbers, classifying objects and identifying community members and places, were each presented quite regularly and appeared to have encouraged significant gains on corresponding subtest scores. Numbers were treated frequently and yielded very high gain scores. Furthermore, skills that were not presented very frequently such as matching, sorting, parts of whole and attitudes to self others and school did not cause significant improvements in scores.

Thus the amount of skill treatment seems to have been proportionate to the gain in subtest scores in certain areas. However, this was not the general rule. Body parts and emotions which were not presented very often yielded significant improvements on the body parts subtest and emotions subtests.

It is possible that certain skills will improve with short presentation time if they are presented very effectively, making immediate impact on the young televiewers. Alternatively, certain skills may be familiar to the children and the test evokes the use of memory of the skill (such as the naming body parts) rather than measuring their performance after teaching the skill de novo. It is also possible to argue that where scores improve with short presentation time the test and not the programme was responsible for the change. For example, where test - retest reliability was low, subsequent gains on that test would be questionable. The emotions test was an example of relatively low test-retest reliability.

Results from the relational terms and letters test also indicate that presentation time was not always directly proportional to the amount learnt. Whilst relational terms were presented relatively frequently and a significant difference was found between viewers and non-viewers on this subtest, both viewers and non-viewers suffered a loss on posttest performance. A possible reason for this result is that Bright Rides might not have presented this s appropriately to the young viewer. Furthermore, relational te which utilise abstract thinking might have been too advanced for the study sample and thus would not have been learnt successfully

in spite of improved presentation. In order to ascertain whether the presentation was ineffective or whether the concept was too abstract, future research would have to investigate new methods of presenting and testing relational terms.

Alphabet knowledge which was presented the most frequently of all skills (almost 24 per cent of the time) yielded the most disappointing test results since a significant gain was not made in letter scores. According to Sister John Vianney, Supervisor of the Holy Rosary Nursery School (1978) the letters were not effectively learnt since they were not presented phonetically. South African and British children entering the early grades are taught sounds rather than names of letters since sounds are more easily understood than letter names. Thus the televised presentation showing the association of a named letter and an object was probably not meaningful to the young preschoolers.

In addition to the main effects of the show, noted above, certain unintended outcomes also occurred. An important effect, for example, was the significant improvement made by viewers on the Peabody Picture Vocabulary Test and on the Draw a Person Test. These tests which were initially used to measure verbal and non-verbal intelligence quotients and mental ages, as baseline or reference measures became more important as dependent variables. They indicated that intelligence measures were also being positively affected by Bright Rides. This result is in accordance with the study by Bogatz and Ball (1971) in which it was found that aptitude and school readiness scores of children entering school improved after viewing Sesame Street.

This finding is of great importance since it opposes the contention of Jensen (1969) and others that the IQ test measures innate ability which is relatively unaffected by experience.

According to Jensen's view, genes endow the child with a certain amount of the fundamental power of the mind and little if anything can be done to change the situation. It is the contention of the present author that if this study has lent support to the antagonists of the genetic school it has made a valuable contribution to psychology since as Ginsberg (1972) notes there must always be interaction between hereditary and environment. At the simplest level, if there is no environment than an organism cannot develop regardless of his genetic endownment and if there are no genes, there is no basis for any development, despite the effects of a benevolent environment.

Another outcome of interest was that of the attitude scores. Results of the two attitude areas indicated that Bright Rides did not increase happy attitudes or decrease sad attitudes of the sample children. This result differs from various American studies which indicated that attitudes to the self, to others, and to school usually improved after viewing 'Sesame Street' and 'Mister Rogers Neighbourhood' (Bogatz and Ball 1971, Coates, Pusser and Goodman 1975, Friedrich Stein and Susman 1975).

Although results from the attitude measures proved inconclusive, the general evaluation of Bright Rides indicated that this educational television programme had a positive impact on Coloured preschoolers in terms of many of the goals it set itself. In addition, more general education effects also appeared in terms of positive effects on measured verbal and non-verbal intelligence.

12.4 The Fourth Question

Which of the sample children learnt or benefited most from viewing Bright Rides, and which learnt the least.

It is necessary, in answering this question to consider a number of subquestions. For each subquestion, only the results of the experimental group are discussed since this was the group which saw the television programme.

12.4.1 Did children from one child care centre learn more cognitive skills than children from another child care centre?

In general it appears that child care centre differences were insignificant in affecting cognitive skill scores. However, they did have an effect on the Peabody Picture Vocabulary score indicating that measured verbal intelligence was positively affected by viewing Bright Rides. The results indicated that children from Jubilee and Dorkas crèches improved considerably on Peabody Picture Vocabulary scores; whilst children from the Holy Rosary Nursery School regressed slightly on these scores. A possible reason for this difference was alluded to in chapter 11 and must now be discussed more fully.

It was noted that different cognitive stimulation at the child-care centres might have affected scores, since cognitive skills appeared not to be emphasized as much at the two crèches as they were at the nursery school. Thus while Bright Rides was an effective cognitive stimulant in the absence of other such stimulation at the two

crèches, it appears to have been less effective than regular perceptual and cognitive training, at the nursery school.

This is probably not surprising since as Singer & Singer (1976) have shown, a group of children given specific live demonstrations in make believe play, made markedly greater gains in imaginativeness of play than children who watched a television programme showing imaginative sequences in the presence or absence of an adult mediator.

To control for the different effects of cognitive stimulation between these centres, a second control group could have been introduced in which children would have been taught cognitive skills by a teacher or through specific skills games. The results of this method in comparison to the televiewing method would then have indicated which of the two was most beneficial.

A live model demonstrating cognitive skills might have been more effective than Bright Rides in teaching cognitive skills since in the former situation the learner would be drawn into doing the exercises at the same time as the live demonstration, while in the latter case, the learner would probably be motivated to perform these skills, but could only do so once the television set was turned off. In addition, the live instructor would have complete control of the immediate environment, thus making the consequences of the action and the reinforcement both obvious and safe. In the case of a television programme the model might provide a demonstration and a limited amount of feedback, but the learner would be left to perform alone, uncertain as to whether he was performing the task correctly or not.

Socio-economic level differences might have been another possible reason for score differences between crèches. According to Noble (1975) children of higher socio-economic status learn to comprehend the story of a television programme before the same age children of lower socio-economic groups. In this study Dorkas crèche which had the highest percentage of upper working class children, scored significantly higher than the Holy Rosary Nursery School on Peabody scores. However, Jubilee crèche which had a majority of middle to low, working class families also scored significantly higher than the Holy Rosary, although social class configurations were similar at these two child care centres.

The effect of social class on score differences was thus inconclusive, but this factor should not be disregarded as ineffective until it is investigated more rigorously in a future study on Bright Rides. It is possible that parent's occupation, which was the index used to assess social class levels in the present study was insufficient as a guide for social class groupings, and that other indicators of these levels should have been found to ascertain whether socio-economic effects were indeed responsible for score differences. However, whilst income, house type, living area, and profession are reliable indicators of social class in Anglo-Saxon groups (Warner, Meeker and Eels 1964), these criteria are inappropriate for the South African Coloured population. The reason is that a large number of dependents in each family, the resettlement of people into areas which they do not choose themselves, restric[illegible] job mobility and various other factors all prevent an assessment of social class along established Westernised theories. It thus appears that a more accurate methodology for defining social class status for this population group should be found before further

research of this nature can be effectively conducted.

12.4.2 Did male or female children learn more cognitive skills from the programme?

The analysis indicated that the child's sex did not affect the results in any way. These results are supported by those of Bogatz and Ball (1971) who found that statistically significant gains did not occur between male and female preschool viewers of Sesame Street.

12.4.3 Did older children learn more cognitive skills than younger children after viewing Bright Rides?

In general, age did not appear to affect gain scores although it did have a significant effect on the relational terms and the matching subtests. The effects of age on these subtests which have been briefly discussed in an earlier chapter will be developed in this section.

The relational terms test required that a child should indicate if a pictured object was : bigger or smaller than another (size relationship); beneath or on top of another (position relationships); or near or far from others (distance relationships) and was thus a test of fairly advanced abstract reasoning, likely to be understood by children at more advanced levels of cognitive functioning. In the present study the younger children who were still at the level of preoperational thinking did not improve on this subtest after viewing Bright Rides, and thus probably had not achieved the necessary level of abstract reasoning.

In addition the three to four year old possibly attended to disjointed segments and did not connect the beginning of a sequence to the end (Noble 1975), preventing full understanding of the total concept. The older four year and five year olds whose scores improved slightly, seemed however to be reaching an understanding of relational terms and to be acquiring increased attention span, as their thought development approaches the concrete operations stage.

The scores of the oldest group also dropped slightly on this subtest. According to Piaget's (1962 b) cognitive development theory, five and six year olds emerging from preoperational thought into concrete operations, begin to organise images and concepts in more efficient ways which changes their perception of the world. They also show comprehension of story line and can predict the outcome of a film (Noble 1975). However, a regression in performance occurs at the transition between the thought stages since the child becomes so absorbed in his new logical powers that he concentrates on isolated incidents rather than on the development of the film to its natural end (Noble 1975). Piaget considers that the child at this transitional stage once again becomes egocentric in order to cope with a new and untried field of cognitive action. The drop in scores of the oldest group was thus probably due to a reemergence of egocentric thought although one should not exclude the possibility that Bright Rides simply did not provide sufficient stimulation to teach relational terms to this group.

Age was also an important variable in the matching subtest. All

three age groups improved on this subtest, although the gain by the oldest group was significantly greater than the gain by the youngest group. The matching skill in which a child had to indicate which picture or letter matched the stimulus, required the use of visual discrimination rather than abstract reasoning and was probably not beyond the cognitive grasp of the very young child. The second age group exceeded the score of the youngest group and the oldest group performed better than the middle group indicating constant improvement with age increase rather than egocentric regression shown in the performance of relational terms. It is possible that matching was an easier skill to acquire than relational terms and was thus not adversely affected by changes in thought processes.

12.4.4 Did children who speak English learn more cognitive skills than children who speak Afrikaans?

Generally language differences had no effect on scores indicating that while the programme was presented in English, Afrikaans speaking children were not placed at a disadvantage. Afrikaans speaking Coloured children in the Johannesburg environs appear to have a great deal of exposure to English in their homes by watching the English programmes on television and at school through their interaction with English speaking peers.

12.4.5 Did children who see television regularly, learn more than children who never or seldom see television?

Televiewing differences had only a slight effect on scores since

only one subtest was found to be significant when scores of rare and regular televiewers were compared. Regular televiewers performed better than rare televiewers on the geometric forms test lending support to the viewpoint of Salomon (1972) that having acquired the skills necessary for media literacy the child will benefit more from other television programmes. The skill of geometric forms which introduces the child to squares, circles and triangles should be presented without interference by the instructional medium since the child will learn less from the content of the programme if he is still coming to grips with the "language" of the medium.

12.5 Integration and Overview:

Many studies have been conducted to investigate the effectiveness of television as an educational medium. The early investigations aimed mostly at providing evidence for the value of television as a substitute for traditional teachers or as a demonstration of the equal or superior value of television instruction as a component of conventional classroom teaching. (Ide 1974, Koenig 1969). The later studies investigated the manner in which the content of entertainment programmes on the national network offered symbolic lessons to children about occupations, racial groups, sex and violence (Liebert, et al 1973). Other studies examined the televiewing habits and preferences of adults and children with a view to introducing attractive educational programmes into the home. (Lyle and Hoffman 1972, Von Feilitzen 1976). After an exhaustive look at the early studies Schramm and Chu

(1967) provide an insight that is borne out through later research. They note that -

> "There is no longer any reason to raise the question whether television can serve as an efficient tool of learning. This is not to say that it always does. But the evidence is now overwhelming that it can, and under favourable circumstances, does .... The effectiveness of television has now been demonstrated ..... at every level from preschool through adult education, and with a great variety of subject matter and method. The questions worth asking are no longer whether students learn from it, but rather (1) does the situation call for it? and (2) how, in a given situation can it be used effectively?" (p 177).

These two questions are pertinent to the present study and will be discussed more fully below.

12.5.1 The Situation:

The first question to ask is whether the teaching of cognitive skills to preschool children called for the use of the televisual medium. Certainly Singer and Singer (1976) found that adult modelling of make-believe exerciseswas more important in encouraging imaginativeness than was the watching of a television programme which encouraged make-believe play, and Gross (1973) has noted that one cannot learn a variety of skills from simply watching a live or filmed model perform these skills, without performing the activity personally.

In encouraging the preschooler to acquire a range of cognitive skills, it is necessary that he will ultimately perform the activity himself because it is only through his performance that one can be sure that he has fully comprehended the skills. However, it is often impractical to teach the child via his own direct experience. Certainly, the best way to teach him about

his city is to take him for walks through its streets, show him a bakery, the fire station, a butchery, dairy and so on. But the young child seldom gets the opportunity to learn in this way since his parents often work throughout the day and the creche or nursery school he attends is usually understaffed and under-financed to allow regular excursions.

According to Ide (1974) a televised walk through the street could convey almost the same experience as the real walk and might even improve on the direct experience by highlighting critical areas through the use of high quality photographic lenses and by giving a fuller perception of the event than might be obtained by personal attendance (Ide 1974). This statement is however subject to controversy since as Olson and Bruner (1974) note, televisual representations specify only a few major features to be looked for when the actual performances are attempted and thus exclude the wide range of incidental experiences which are necessary for the complete performance (p 184). Furthermore television representation is limited to the literacy of the individual in that medium and thus television instruction relies heavily on prior or subsequent experience to realise the information to be learnt.

Perhaps the real importance of the televised presentation rests in its ability to introduce the child to the conventions of visual literacy which are vitally important in the present technological society. As Ide (1974) notes the rapid increase of film and television necessitate that children of today become increasingly oriented toward visually communicated information. They need to learn a new visual language replete with its own syntax and grammer in order to understand the use of the zoom, the dissolve, the fade, the close-up

the long shot, motion, image and sound since these might soon replace the dot, dash or exclamation mark of print literacy. Thus when the child is taken on a televisual journey he will not only visit the bakery, but he will zoom-in on the bread-making and see close-ups and long shots of the rolling pin. He will thus acquire information about the functions of the bakery as well as skills into the different ways of seeing and understanding it.

It may be argued that if he understood the processes of close-ups and long shots at an early age, it is questionable whether he will learn more from a repetition of these techniques. However, as Ide (1974) argues, people may enjoy a televised representation on different levels of sophistication and each may benefit from the experience. The present author supports this contention since the young child may initially view television as a passive onlooker with little appreciation of television technique, viewing more appreciatively as he grows older until he has limited technique perception. Still later he might view as a critical judge who weighs the televisual representation in terms of predetermined criteria, or as an intellectual monitor who carefully stores and processes new formats. He might finally view as a creative percepter who interacts with the televised formats, conceiving of his own ways to represent the material. Thus the developing individual could learn constantly through his interaction with the televisual medium.

The televisual mode was used in this study to expose the child to experiences and ideas he might never see in his daily life, to highlight that experience and to demonstrate various cognitive

Author Galaun C
Name of thesis The acquisition of cognitive skills as a function of a television programme 1979

PUBLISHER:
University of the Witwatersrand, Johannesburg
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