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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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skills in a manner that would encourage participation so that he would perform those skills when the television set was turned off. It was also hoped that he would incidentally acquire new skills necessary for media literacy to prepare him for future instructional television programmes since without a good grasp of televisual literacy the child would not be able to benefit fully from the content and formats presented in more complex programmes. (Solomon 1974).

The question arises as to whether there is any superior medium for achieving the abovementioned objectives. According to Arnheim (1969) visual images and symbols are capable of communicating and expressing meaningful information that cannot be formulated in any other mode, and other theorists Gombrich (1974), Jenkins, Neale and Deno (1967) also argue that the visual mode is a more effective instructional medium than is the verbal mode of language. However, as Worth (1974) has noted, there is no purpose in arguing that the visual is superior to the verbal mode since both are important in developing symbolic thought. For instance, language as opposed to pictures allows a more accurate selection of meaning between alternatives whilst pictures offer a wider choice of elements from which vast amounts of information can be extracted. Visual displays provide more alternatives and more opportunity for enquiry than do words, whilst words indicate concisely and directly the message to be conveyed.

The present research did not investigate whether it would be more effective to teach the child via a verbal rather than a visual presentation; instead it mixed the two forms using a verbal commentary with a visual display. Rohwer (1970) offers support

for this mode of instruction since he feels that children should be taught to use both verbal and visual kinds of activities to increase their own powers of learning. The child cannot always rely on the world to offer up information in the best ways, and so he should be equipped to transform information himself into a form that renders it maximally memorable. (Rohwer 1970 p 402).

By what process was the visual medium able to encourage the development of the young child's thinking and behaving. Although this study did not investigate the mechanisms of media literacy, Jenkins, Neale and Deno (1967) have noted that a picture employs a very dense symbol system which arouses great activity for the selection of cues and causes the transformation of these cues into one or more internal verbal descriptions. Thus the child is drawn into active cognitive participation with the medium which triggers new modes of perceiving and conceptualising. For example, the presentation of a matching skill in Bright Rides probably induced the child to actively compare and select cues necessary for matching. This skill was then translated into a concise internal verbal statement to be stored and used in future matching tasks. In addition the televisual mode encourages the following forms of thinking in the viewer : -
i) Two visual displays placed side by side activate comparision and discrimination, (Gropper 1970); ii) two visuals presented successively activate a continuation mode (Solomon 1974); iii) a caricature makes the viewer fill in the missing information (McLuhan 1965) and iv) various other specialised techniques can elicit an understanding

of irony, personification and deliberate overstatement or understatement (Millerson 1961). It thus appears that the televisual mode can induce a range of new thinking skills in the young televiewer, although the manner in which this occurs would have to be investigated more fully in a future study.

Bright Rides was presented to children in the crèche or nursery school setting. Yet it is questionable whether this setting was suitable for the presentation to have its greatest effect. Singer and Singer (1976) contend that in nursery school settings where children watch television together in large viewing groups, less learning occurs than when they watch individually or in small groups. In addition they suggest that learning from a television programme increases if the child is accompanied by an adult mediator who explains events and encourages participation in the programme. Thus Bright Rides should have been presented in a setting for individual viewing such as the home, during a time when parents could join their children in televiewing. However, since Bright Rides could not be broadcast on the national network[i] it was not possible to show the programme in each home and the child-care centres became the next best venue. The presentation of the programme in the crèches proved generally to be effective and these results pave the way for further large scale research into the effects of Bright Rides in other schools and centres.

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i Bright Rides which was filmed by Witsvision, the Wits University television studio, does not comply with levels of technical performance required by S A T V and so will have to undergo modifications before it can be telecast nationally.

In addition it is hoped that Bright Rides will soon be presented on the national network to be viewed and tested in the home setting.

12.5.2 The Effective Use of Bright Rides:

The effective utilisation of educational television still seems to be a confused issue. Roberts and Schramm (1971) and Twyford (1969) consider that television instruction is successful when the programme content is well organised, meets high pedagogical standards and is presented in a learning context. However, it is the view of the present author that these criteria are too general and vague to be of practical value. Allen (1971) has noted that the specific characteristics that bring about learning are yet to be determined and that research has so far ignored such questions. Nevertheless, it appears that formative or planning research into recent television programmes is providing the much needed body of information about the most effective and important elements of television presentations.

The childrens television workshop, created in 1968 used formative research methods in the production of Sesame Street and the Electric Light Company, two American Educational programmes. These programmes were modified and improved according to research into their appeal comprehensibility, activity eliciting potential and amount learnt by the viewers.

Bright Rides also employed formative research methods setting out to develop an educational programme by research and revision. As has been noted previously the objectives of Bright Rides were to teach a range of cognitive skills through entertainment and

happiness. The cognitive skills test, used to measure how much learning had taken place, showed that there was room for improvement in the televised teaching method. As has been noted the content analysis showed that entertainment was consciously integrated into the programme and it was observed that the children enjoyed the presentation. However more extensive research into appeal was not conducted and so presents itself as a topic for future research. In addition credibility, internal compatibility of elements, comprehensibility, memorability, and many other programme attributes should be investigated in future research on Bright Rides in the search for the most effective way to present cognitive skills to the preschooler.

According to Palmer (1974), formative research typically makes use of the combined effort of producers and researchers in a cyclic process of empirical evaluation and production revision. The producers present various selections of television material for testing by the researchers after which stage production techniques are modified by the producer according to the recommendations of the rese... rs. This process requires the highest level of team workmanship if the researcher-producer model is to be effective. ... Palmer (1974) notes the producers must have the ability not only to see the implications of the research but also to carry these implications through into the form of new and revised production approaches.

In the production of Bright Rides the producer and researcher were one and the same person. This situation certainly enabled intimate co-operation between researcher and production 'teams' since the producer witnessed the research into the productio...

and the researcher was present during the actual production. However, this partnership was limited in that the ideas of only one person were being investigated and modified. Research which involves the use of a team of producers and a team of preferably multi-disciplinary researchers enriches the quality of the production and subsequent research. Palmer (1974) notes that the increasing prominence of television education necessitates the use of production teams whose members possess a diversity of highly specialised talents.

In the absence of a team of producers and researchers working directly on the production of Bright Rides, use was made of the suggestions of people not directly involved in the production, yet experienced in production techniques and advanced research methods. These ideas while providing valuable input to the programme were limited in that feedback from the advisors was not available during all stages of the production.

12.5.3 Formative Research as the Methodology for the Present Study:

The initiation of formative research into the South African context was considered an exciting and important project, as to date there is a paucity of relevant indigenous South African programmes although formative-research could help develop such programmes. In addition it is an exciting prospect to investigate new forms of research such as the formative approach which departs from the traditional hypothesis oriented research model but which nevertheless contributes to a new body of research methodology.

The main objective of formative research recommendations is that they appear likely to contribute to the effectiveness of the

product or procedure being developed. It is not necessary that they be validated by the research out of which they grew since establishing their validity is the function of summative research.

At this stage Palmer (1974) notes there is no tradition of accumulated knowledge in the area of formative research practice. This is partly because so little research of this type has been carried out, but it is even more a result of the fact that it has only recently come to be recognised as a distinct and systematic field of endeavour. Palmer considers that the lack of literature on formative research is in no way commensurate with its promise for education.

> "The promise of the approach is that it will provide designers of educational products and practices with empirical data far more directly pertinent to their respective media, materials and learning conditions than are the results of traditional more basic research. For the field of educational television in particular, it offers ways to bring about planned effects .... and a means for ensuring in advance that programmes will achieve their objectives". (p 307).

According to the results of the research on Bright Rides, the way is open to produce and improve educational programmes along the identified objectives, of education through entertainment. With continued research into the programme, it is hoped that Bright Rides will become an increasingly important teacher of cognitive skills necessary for school readiness. To this end those skills that were not successfully taught, such as letters knowledge necessary for prereading, matching, sorting and attitudes toward the self, others and school, ought to be modified and skills which were successfully taught should be improved. In addition new cognitive skills could be introduced such as a test of the content presented in Bright Rides or a test of imaginative play. Because of the formative research

procedure adopted in this production Bright Rides may be continuously modified to include those cognitive skills which educationalists might deem desirable at any point of time.

12.6 Criticisms:

Although various criticisms have been made throughout the main body of the discussion, three areas still remain to be examined critically. These are criticisms (i) with regard to the use of television as a medium of instruction; (ii) in connection with the production of Bright Rides and (iii) in respect of the testing procedure.

12.6.1 Televisual Mode of Instruction:

(i) The televisual mode used in this study may have been inaffective as a teaching device for Coloured preschoolers who do not have a high degree of televisual literacy. As Gross (1974) notes, there is a level of sophistication necessary for the proper understanding of visual images.

> "Pictures and films often convey misleading impressions of scale, distance, time and relationship. By overcoming the limitations of space and time they may also fail to communicate the reality and importance of these dimensions" (p 77).

In addition images conveyed via these media may be deliberately or inadvertently false. The potential for misleading and confusing fiction and reality, seem to be as great with photographs and films as with words and actions, and quite possibly much greater (Gross 1974).

Salomon (1974) points out that a particular range of aptitudes is necessary for the child to understand a programme like Sesame Street, or Bright Rides. This study sample was not tested to determine levels of perseverance, impulsivity, and initial general knowledge, which are factors that may have determined the amount learned from the programme as a whole. In addition,no investigation was made into more specific media variables like "zooming in" on details and relating them to contexts or connecting discrete time segments which require more detailed aptitudes. Salomon (1972) found that students with low ability of this kind fail to infer the appropriate relations between part and whole. Thus a zoom-in may not have activated in this sample the process that would ensure the extraction of the information required by the producer's objectives. In this way a low degree of literacy in the televisual medium could severely restrict the information a subject would extract from that symbolic display.

(ii) Apart from media literacy, individuals also differ in terms of concerns and interests and intentions at any given time. What the child sees depends upon what he is looking for or upon his perception of the task. For this reason it became difficult to predict the kind of information any particular learner would extract from Bright Rides. The M-Test used in this study,probably measured only a small amount of learning that took place, namely that part that the producer was interested in testing. However, it did not necessarily reveal the greater part of the child's learning,

namely that which the child personally wanted to learn from the programme.

iii) A third criticism may be levelled at the assumption made in chapter 3 that children will learn cognitive skills after relatively brief exposure to a television programme. Although it has been noted that American Indian preschoolers were able to learn from a 20 minute video portrayal of television models (Henderson et al 1975) more research into the amount of learning possible from brief exposure will have to be conducted to conclusively accept Henderson et al's results. It should be noted however, that Bright Rides was viewed three times a week for four weeks, and a number of sequences were repeated in each programme such that exposure was concentrated even though it was conducted over a short period of time. Results from this study indicate that the scores of children improved after viewing Bright Rides. Thus if the period of televiewing to which the present sample were subjected is regarded as brief in the sense that televiewing continued for only a month then the results of this study lend support to Henderson et al's findings mentioned above.

12.6.2 Production Defects:

i) The programme had several technical defects. For instance dark patches, light flashes and inconsistent sound levels occurred in some sequences. The reason for these defects was that the television studio was being closed for renovation towards the end of filming. Thus portions of dark film had

to be hurriedly transferred onto videotapes, and editing of the programmes had to take place in an unsound-proofed editing room equipped with inadequate facilities. Furthermore editing and sound dubbing was performed by an unprofessional team of editors, namely the producer and a television technician, and so technical perfection was further restricted.

(ii) As has been noted previously in this chapter, letters were not effectively taught since they were not presented phonetically. It appears that letter sounds are more readily understood by preschoolers, than are letter names since sounds relate more easily to words in everyday conversation than do letter names which often have little relation to the word in which they appear. Thus letter naming and recognising would have been more effectively learnt through the phonetic presentation of letters.

12.6.3 The Testing Procedure:

(i) Testing of preschool children presents many problems of administration and scoring (Anastasi 1968). In this study, the main problem appeared in connection with the establishment of rapport

> "for young children are often shy with strangers, easily distracted and possibly negative to the demands made of them" (Anastasi p 262).

The use of untrained testers has been discussed in Chapter 9 above, and it has been shown that whilst there are advantages to using untrained testers (Bogatz & Ball 1971), this might have detracted from the performance of the children. Testing was usually performed in a small room at the child care

centres, and in several cases, anxiety, distraction, negativism as well as shyness were reported. In addition Almy (1975) notes that there is daily variation in the young child's test performance which detracts from the reliability of test results.

Anastasi (1968) contends that a skilled and experienced examiner is a prerequisite in the testing of young children in order to recognise "signs of fatigue, drowsiness, fear, inattention, and other adverse conditions". (p 262).

The examiner must be able to adjust his procedure accordingly to these conditions.

(ii) Two-dimensional drawn pictures were used in the testing procedure which may be unsuitable for cultures unaccustomed to representative drawing. A two-dimensional reproduction of an object is not a perfect replica of the original; it simply represents certain cues which as a result of past experience lead to the perception of the object. According to Anastasi (1961) if the cues are highly reduced, as in a simplified or schematic drawing, and if the necessary past experience is absent, the correct perception may not follow. A considerable body of empirical data exists, indicating marked differences in the perception of pictures by persons in different cultures (Hudson 1971, Ortar 1963, Miller 1973, Segall, Campbell and Herskowitz 1966), thus it is possible that the Coloured sample did not have sufficient exposure to two-dimensional drawings for the test to provide reliable results.

In addition the present study showed a television programme which used a type of pictorial representation requiring the correct

perception of televised pictures of objects as the stimulus while the response was tested according to two-dimensional drawings. Televisual literacy requires a different perceptual set to that of drawn pictures and thus the test might not have provided valid results from the television programme. Future research should investigate the use of a televisual method of testing televisual stimuli.

(iii) The M-test was constructed to test the sequences shown in Bright Rides and for this reason the test items relate specifically to cognitive skills shown in Bright Rides and not universally to any range of cognitive skills. Although the M-test correlates significantly with the DAP (r = 0,652) it does not correlate significantly with the PPVT (r = 0,056) indicating that the M-test measures skills of non-verbal intelligence rather than skills of verbal intelligence. Common variance shared by the M.test and DAP is relatively low (0,425) and far lower (0,003) with the PPVT indicating that very few skills are common to the M-test,DAP and PPVT. Although the M-test may be able to test effectively what it set out to test (test-retest reliability), if it does not have objective reference to another test of similar nature its applicability is limited. Thus it could be said that the major criticism of the M-test is that it is not based on an objective framework in that it does not share high common variance with the DAP and PPVT. Nonetheless it is possible that the M-test will share common variance with a test not included in the present study. However, this assumption lies outside of the realm of this investigation and may be verified only in a future study.

(iv) The Peabody Picture Vocabulary test and the M-test have not been standardised on the Coloured South African population and this factor may have affected the results obtained from this group. The Peabody which was standardised on North American children contains content which is often unfamiliar to White westernised children, let alone to Coloured children who are not usually exposed to American or Anglo-Saxon vocabulary stimulation. The M-test which was based on the original American battery, for testing Sesame Street, was adapted with the conscious motivation of finding a culturally suitable test for Coloured preschoolers. Yet it was also restricted in that it was constructed within terms of the Westernised bias of the present writer. Coloured school teachers and parents were consulted as to the suitability of items on the test, and a pilot study was conducted, but the validity of this test is still doubtful until it is standardised over a large population of Coloured preschoolers.

Test content is one of the parameters along which cultures differ (Anastasi 1968). Most language and non-reading tests call for items of information that are specific to certain cultures. For example they may require the examinee to understand the function of such objects as the telephone, the violin, the postage stamp, or the mirror. Persons reared in certain cultures may lack the experimental background to respond correctly to such items. The problems of testing people with dissimilar cultural back grounds has received considerable attention since the midcentury (Anastasi 1968). Diverse cultures or subcultures further

the development of different skills and knowledge, and these differences are reflected in test scores. Anastasi (1968) notes that a minority group is often referred to as culturally disadvantaged when its scores do not equal the scores of the majority. In this way when the individual of a subculture is placed in competition with individuals of a culture in which he was not reared and shows cultural differences, he is perceived as culturally disadvantaged. Conversely, the culturally advantaged individual suffers when displaced from his mother culture.

(v) Testing was conducted in English or in Afrikaans according to the language preference of the child. Yet many of these children spoke an imperfect English or Afrikaans, intermixing the two languages randomly in their conversation. Thus their comprehension of questions and their subsequent answers might have been impeded by questioning in one language medium. Anastasi (1968) notes that language is a known difficulty in cross-cultural testing. The translation of a test from one language to another causes problems regarding the comparability of norms and the equivalence of scores. The simply translation of a test is never sufficient, and adaptation and revision of cont . is generally required.

Yet Anastasi (1968) notes that nonlanguage tests are often more culturally loaded than language tests. Investigations into a wide variety of cultural groups in many countries have found... larger group differences in performance of nonverbal tests than in verbal tests (Anastasi 1961, Irvine 1969, Jensen 1968, Ortar 1963, 1972, Vernon 1965). Ortar has noted that whilst one

can translate verbal tests into another language, it is

> "well-nigh impossible to translate and adapt test performance from one culture to another". (p 76).

(vi) Conditions for testing the experimental group were possibly different to those for testing the control group since pretesting of the experimental group took place six weeks before that of the control group and posttesting of the experimental group took place six weeks before that of the control group. Whilst a time lapse of six weeks is not considered a crucial space of time in terms of cognitive development stages, it is possible that new cognitive skills were learnt during this period without the intervention of Bright Rides. Furthermore, scores of the experimental group might have been better than those of the control group since testers had become a familiar friendly phenomenon in the crèches by the time the experimental group was tested, whilst they constituted an unknown and possibly fearsome prospect to the control group in the early stages of testing.

In a design in which control and experimental groups are pretested and posttested concurrently, one eliminates the possibility that the aforementioned extraneous variables will affect scores. However, in this study, the possibility that viewers would inform non-viewers of what they had seen, or that jealousy might arise between viewers and non-viewers, was considered more detrimental to unbiased comparisons than the possibility that unknown skills would be learnt by the children. It is certainly a difficult task to introduce an attractive entertaining intervention into the environment of some children,

to the exclusion of others in their proximity without affecting the feelings of the excluded group. The present author considers that the feelings of young children cannot be disregarded in the pursuit of scientific research since. ethically, research should not override human considerations and practically, research would be impeded by hostile emotions.

(vii) In order to evaluate the effectivity of Bright Rides, the study used one control group which did not see the television programme which was then compared to the experimental group which saw the television programme. However, additional control groups should have been included to eliminate extraneous contaminating variables. It will be recalled that at two crèches, sad attitudes decreased from pretest to posttest on the control group, indicating that the simple intervention of testers or interested adults into the school environment improved attitudes towards the self and others. A control group of interested adults, simulating the attention paid to children by the testers should thus have been included to eliminate this effect.

(viii) An arbitrary decision was made as to the grouping of televiewers into regular and rare televiewing groups. It was considered that four times a week constituted regular televiewing and three or less times a week was rare televiewing, yet these allocations were not based on tested guidelines. Whilst scores did not generally differ between regular and rare televiewers, differences might have been found if, for example, three times a week or more was considered as regular televiewing.

However, it appears that research often involves the use of some arbitrary guideline (Palmer 1974, Kerlinger 1964, Lesser 1974), and thus the decision to allocate the groups in the abovenamed manner should not be viewed too seriously.

Another criticism may be levelled at the fact that the children alone were asked how often they viewed television. It is possible that the younger children did not give entirely accurate records of their viewing frequencies which might have affected scores. Parents should have been asked how often they considered their children watched television to corroborate the results indicated by the children. Yet this method is also problematic since some parents might not have known how often their children watched television.

(ix) The M-test was not used to its best effect. Whilst each subtest was broken down into various subsections, scoring revealed only a global score for each subtest. For example counting, number correspondence, number identication, and so on all constituted the numbers subtest, yet a total score for numbers was the only measure indicated in the results. Thus one was unable to identify which subsection of a test was best learned or best performed.

(x) The guidelines for the scoring of the Draw a Person test, although ostensibly objective, often called for a subjective interpretation.

12.7 The Need for Further Study and Research:

Throughout the chapters of this dissertation the need for further research has been indicated and new questions growing out of the study have been asked. It is now pertinent to highlight a few aspects which will require further study.

(i) Bright Rides set out to teach a set of explicitly defined cognitive skills and the M-test was designed to test whether those cognitive skills were in fact learned. There is a danger, however, that what the programme intended to accomplish was not what the test actually measured. Future research would thus be of considerable value if it could find the means to test the intended objectives more closely. This could be achieved by including more items into each subtest or by questioning a child directly about what he learned from each film segment.

In addition, a programme like Bright Rides is likely to produce unintended consequences, either beneficial, harmful or both and thus a complete evaluation should include these outcomes along with those that are intended. However, since by definition, unintended effects cannot be anticipated in advance, it is difficult for research to identify where to look for them. It appears that unintended effects might have their source in episodes where novel elements have been deliberately added in order to make them more humourous or more interesting. For instance in one sequence of Bright

Rides, a pugnacious puppet Big Problem, crushes the square which Fuzzy Joe is demonstrating and exists laughing while Fuzzy Joe is left to repair the square.

Although the outcome is positive, in that Fuzzy Joe finds that he can construct a triangle, it is possible that children will learn other unintended lessons, for instance that crumbled squares always turn into triangles or else that it is acceptable to laugh at the misfortune of others.

Future research should thus investigate methods of identifying unintended effects with a view to enhancing them if they are beneficial or to limiting them if they prove harmful.

(ii) One of the methods of identifying unintended outcomes is by observing the reactions of the sample children to the programme. Palmer (1974) used observational researched to investigate the appeal comprehensibility and activity eliciting potential of Sesame Street. While most research into television's effects on children has been conducted by means of standardised pencil-and-paper tests, observational research is gaining acceptance as a valid and important method which will provide valuable information in further research on Bright Rides.

(iii) Posttesting was conducted one week after the last of the twelve programmes was shown in the centres and was the only test to evaluate the effectivity of Bright Rides. It should be noted that the pretest which was conducted prior to showing the programme was used only to establish a baseline level of cognitive skills performance. Future research would thus be valuable in introducing a range of tests to be conducted after each programme

had been shown with a view to establishing which programmes were the most or least effective. In addition, posttesting should also be conducted each month for approximately one year after the series has been completed, to ascertain whether Bright Rides has long term learning effects on its viewers. In conducting such research the introduction of control groups would be necessary to remove the effect of extraneous variables on learning during the course of the year.

(iv) Lesser (1974) notes that no single form of instruction works equally well for all children, and that while television may be an excellent medium for some children it is a very poor one for others. Similarly the presentation of a particular television programme to one group of children may be effective while it is unsuitable for another. Bright Rides aimed at reaching a group of culturally disadvantaged children and in this it appears to have been successful. However, it was hoped that Bright Rides would soon be broadcast nationally and thus a priority for future research would be to investigate whether it would be of value to other groups like a middle class or culturally advantaged sample. Such research would be of value in indicating whether Bright Rides should be modified in order to attract a larger audience whilst still retaining its appeal.

However, its value would be diminished if such results were used to compare the scores of middle and lower class children.

Culturally advantaged children who have a range of educational experiences wider than that of culturally disadvantaged children are likely to perform better than their disadvantaged counterparts. Furthermore, as Lesser (1974) notes previous research by Jensen (1969) and Shockley (1971) have supplied enough "invidious comparisions" among ethnic groups to generate strong reservations to this type of research. (Lesser 1974 p 145). Thus the purpose of future research would be to create a programme from which all children would benefit regardless of their background, socio-economic status or race. To this end it would be important to make statistical comparisions within groups rather than between groups, since it would be valuable to determine whether lower socio-economic viewers learn more than lower socio-economic non-viewers, but irrelevant to note whether lower socio-economic viewers learn more than middle socio-economic viewers.

(v) As has been previously indicated, the M-test was not standardised on the Coloured preschool population. Thus while the results indicated that learning occurred in this sample, these results are not conclusive. Future research should thus be launched into the testing of a large group of Coloured preschoolers as well as groups of other preschoolers who might in future be the next viewers of Bright Rides.

(vii) The research recommendations described so far concern the best methods to evaluate learning from Bright Rides and how to improve this production. Perhaps Bright Rides could serve an even more important purpose by beginning to correct misconceived ideas about how children learn from the visual media, and to

understand which methods will allow the most effective use of televisual instruction. Lesser (1974) notes that although many studies have been conducted into the televiewing habits and preferences of children, "we are ignorant about how children do learn from the visual media". (p 150).

Long-term research on a programme like Bright Rides would certainly provide some understanding of this problem, but long-term research should extend beyond any single series of programmes.

It is thus pertinent now to examine how educational television can be used most effectively and then to consider a number of questions relating to the effect of television on our lives and on the lives of our children.

According to Bruner (1966) one of the weaknesses of educational television is that it "aspires to self-sufficiency, failing to join skilfully with other media and techniques". (p 58).

Ide (1974) also considers that "television cannot stand alone in the educational process, and hence will be utilised most successfully in a mix with other media". (p 350).

Future studies should investigate how other media or teaching techniques might be combined with televised instruction. For instance in the classroom, a lesson could be conducted in the following way. A teacher introduces the lesson, switches on the television to an animated portrayal of the subject, switches off the television to conduct a role-play in which the children themselves are involved, explains what has been seen

and performed by means of charts or diagrams, and calls for comments from the students.

In the home, a television programme like Bright Rides viewed by itself would also not produce important effects on children unless it was reinforced by other influences in their lives. Bogatz and Ball (1971) and Singer and Singer (1976) have indicated that when a parent or adult mediator explains and encourages participation in the programmes, children learn more than if they are left to view the programmes alone. Future studies should thus investigate the effects on parents and children who the two are encouraged to view television together. For instance it is proposed that the childs self-concept might improve in the presence of an older person admiring his response to the television programme. In addition viewing together might create an appetite for learning from each other which might be of greater importance than the learning of a set of skills. Future research could also investigate the proposal that when adults take the opportunity to watch a child respond and learn, they develop more constructive expectations of the child that in turn have important consequences for the childs expectations for himself.

In addition to these proposals a number of questions are posed which indicate new avenues for research.

(a) When children begin watching television for the first time, at whatever age this occurs, how does the experience affect their perception of themselves and the world around them?

(b) Can television help people understand their own thoughts and feelings as well as the thoughts and feelings of others?

(c) What cognitive effects does television have on children as young as one or two years of age? Do the formats of television "supplant in" the mental operations of the young child, making him develop televisual schemas?

(d) Will the young South African child growing up with television develop cognitively, socially and politically in a different way to the individual who did not see television throughout his life?

(e) More specifically, since cognition and social values are said to be closely linked (Feuerstein & Rand 1975), will the separate development model presented by S A T V cause individuals to have a more insular conception of their society as opposed to individuals previously exposed to printed media, such as the newspapers, which often emphasized the common collectiveness of men rather than their separate ethnic differences?

Questions of this nature require long-term research on a variety of programmes. While television is still in its infantile stages in South Africa, there appears to be no pressing need to answer these questions immediately. However, television is destined to become more important in our daily lives and so future research should begin investigating these proposed questions.

13. Summary and Conclusion:

The major aim of this study was to demonstrate that cognitive skills can be acquired through watching a television programme which intends to teach a range of cognitive skills.

However, in fulfilling this aim it was considered important to produce a television programme that would not only educate, but would entertain at the same time. To this end, special entertaining devices were written into the script of Bright Rides and these appeared to have appeal for the viewing children in that they sang, laughed and clapped while they watched the programme. A number of adult viewers, however, indicated that appeal and interest could have been increased, for example, by presenting popular puppets more regularly, but comments were generally favourable as to the entertainment level of Bright Rides.

The fact that Bright Rides was entertaining was perhaps one of the most important outcomes of the study since it was the view of the producer that if a childrens' education programme lacks the incentive of fun and enjoyment it should not be presented at all. It is for the very reason that entertainment and excitement have been neglected in many education practices, that education has come to be viewed as tedious and uninteresting. Clearly it is time to revitalise the whole process of education, and enjoyable educational television can lead the way in this venture.

It was also considered necessary to teach cognitive skills that would help prepare the child for school, despite the views of certain education critics that educational television programmes should supercede school curricula and teach the child skills that he will never learn at school. In this study, culturally disadvantaged children were the televiewing sample, and since these children often lack mediated learning experiences, necessary for school readiness, and usually flounder when they enter school,

Bright Rides aimed to help prepare them face school without the fears of future failure. Whether this ideal was achieved could only be measured in future years when the child would enter school, but the present study set its task at investigating whether Bright Rides was effective in teaching cognitive skills to these preschoolers. The results indicated that while some skills were taught successfully, others were not, and thus that while Bright Rides has the potential to instruct, it has scope for improvement.

In the testing of cognitive skills, it became apparent that mastery would not be achieved in any skill that was taught. However, this fact did not detract from the results, since Bogatz and Ball (1971) have noted that mastery learning is rare in any educational programme. The producer did not expect that Bright Rides would teach any skill perfectly, nor was it viewed as the only means a child would have throughout his educational career of achieving mastery in any skill area. It was simply seen as an impetus to interest children in a range of learning possibilities and to make some learning impact, and in this venture it appears to have succeeded.

The intended effects of Bright Rides, namely the teaching of cognitive skills were tested by means of the M-test, a test of cognitive skills, specially adapted for this programme. However, an important unintended outcome also occurred. A significant improvement was made by viewers on Peabody Picture Vocabulary and Draw a Person scores, indicating that intelligence measures were also being positively affected by

Bright Rides. This result demonstrated that the unintended effects of a television programme are often more important than the intended effects and implied that if a programme like Bright Rides could help raise the measured intelligence scores of its viewers, formats of this type should be exploited with a view to raising the intelligence levels of future generations.

Another aim of the study was to ascertain whether some children learnt or benefited more than others, after watching Bright Rides. Whilst isolated differences occurred on a number of tests, it appeared that child care centre differences, sex differences, language and televiewing differences did not significantly affect most scores of the sample.

From these results one might conclude that children from these different groups all benefited from the programme, although some of the older, English speaking, regular television viewers at Jubilee and Dorkas crèches might have grapsed the intentions of the programme faster than others.

Older children probably understood the programme better than the younger children because of their more advanced stage of cognitive development. English speakers heard the programme in their mother tongue, in contrast to Afrikaans speakers; regular televiewers were probably more television literate than rare televiewers and children at the two crèches probably had more to learn from a television presentation than had their counterparts at the nursery school who received real life instruction in cognitive skills acquisition.

These results also highlighted the potential of Bright Rides for future televiewers for if it was beneficial to most of its present viewers it could be of value to larger groups of children of different races, education standards, intelligence levels and socio-economic status.

Bright Rides was presented in the child care centres and received enthusiastic reports from staff members of those centres. However, as has been mentioned above, it was hoped that Bright Rides would be broadcast nationally to reach the child in his home, to take the place of absent mediated learning experiences or to supplement existing learning experiences. It was also envisaged that parents should be encouraged to join their children in televiewing so that parents and children would gain an appreciation of how much they could learn from each other, and that parents would develop realistic expectations of their children through contact during these televiewing experiences.

It was noted however, that although the programme appeared effective for the present viewing group, the results indicated that improvements should be made in the production of Bright Rides and in the test to measure what was learned. However, the function of formative research is continuously to revise and improve a process or product, and thus research into Bright Rides has only begun. The results gained from this study, pertaining to the production and pedagogical effects, must now be injected into a new production with new or modified objectives. In its role as the initiator of a cyclic process of research, Bright Rides is perhaps

most constructive since it can provide new material and ideas for the national network of South Africa in the hope of finding the best methods to teach South African children.

To conclude, as has been mentioned above, the study on Bright Rides was conducted as an experiment into the production and testing of an educational programme and to the extent that it has provided new ideas in these areas, which may be used in future programmes, it has been of value. However, since psychological research aims to establish a general rule from a specific example, the production of Bright Rides will prove most useful if it can provide a greater understanding of educational television in general, and the manner in which children learn from it.

As yet educational television is still an undiscovered area of research, although its potential has been perceived and recorded. Lesser (1974) notes that television has opened unique opportunities for children since it provides

> "vivid visual portrayals of the world beyond classrooms and neighbourhoods, and children respond to them as they have never responded to verbal and abstract education" (p 150).

Bright Rides demonstrated that children respond enthusiastically to a televisual presentation, and further that if the programme is exciting and stimulating they will learn joyfully from it. It has shown that culturally disadvantaged children can learn a range of cognitive skills from its presentation, although the method by which they learn those skills is still not understood. It has also shown that measured intelligence scores increase and that

attitudes to self, school and others might be improved through watching a programme that encourages positive attitudes. These findings must be tested in other productions and with other samples, but they provide important conclusions which if further exploited may stimulate South African childrens' educational television to great achievements.

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APPENDIX A1 SAMPLE PROGRAMME OF BRIGHT RIDES.

EDUCATIONAL TECHNOLOGY UNIT

PROGRAMME 3. page 1.

BRIGHT RIDES

shot	camera	video	audio
		PRESENTER HOLDING BIRD'S NEST	HELLO - LOOK AT THIS - IT'S A BIRD'S NEST. I FOUND IT UNDER A TREE AFTER WE HAD A BIG STORM. THE WIND AND THE RAIN MUST'VE SHAKEN IT OFF THE TREE
		PRESENTER	DO YOU KNOW WHAT KIND OF BIRD BUILDS A NEST LIKE THIS?
		GRAPHIC OR SLIDE OF WEAVER FOLLOWED BY TELECINE OF WEAVERS HUMMING AROUND AND BUILDING NESTS (IF AVAILABLE)	IT'S A WEAVER.
		PRESENTER WITH 3 BIRDS EGGS AND 3 HENS EGGS	WELL, WEAVERS LAY EGGS LIKE THESE. BUT HENS LAY BIGGER EGGS - LIKE THESE.

EDUCATIONAL TECHNOLOGY UNIT

PROGRAMME 3. page 2.

BRIGHT RIDES.

shot	camera	video	audio
		PRESENTER AT SIDE OF BOX WITH 4 COMPARTMENTS	NOW HERE'S A GAME WATCH CAREFULLY
		PRESENTER SINGS WITH GUITAR	4 OF THESE THINGS LOOK LIKE EACH OTHER, 4 OF THESE THINGS LOOK LIKE EACH OTHER. 4 OF THESE THINGS LOOK LIKE EACH OTHER - BUT ONE OF THESE THINGS IS THE ODD ONE OUT. CAN YOU GUESS WHICH ONE IS NOT LIKE THE OTHER BEFORE I FINISH THIS SONG?
		CHILD	THIS ONE
		PRESENTER	THAT'S RIGHT - THESE 3 ARE SMALL EGGS AND THIS ONE IS LARGE. VERY GOOD.
		PRESENTER SINGS WITH GUITAR	4 OF THESE THINGS LOOK LIKE EACH OTHER BUT ONE OF THESE THINGS IS THE ODD ONE OUT - CAN YOU GUESS WHICH ONE IS NOT LIKE THE OTHER BEFORE I FINISH THIS SONG?

shot	camera	video	audio
		CHILD	THIS ONE
		PRESENTER	THAT'S RIGHT THERE ARE 3 EGGS HERE AND 1 SQUARE BISCUIT HERE YOU ARE
		CHILD TAKES AND EATS BISCUIT	MM THANKS
		GRAPHIC OF HEN	O.K. WE'VE GOT A WHOLE LOT OF EGGS AND WE KNOW THEY WERE LAID BY A HEN LIKE THIS YOU MAY HAVE SOME CHICKENS IN YOUR BACKYARD. IF YOU DON'T YOU HAVE TO GET THE EGGS FROM SOME OTHER PLACE - RIGHT GAVIN
			RIGHT
		TELECINE OF SUPERMARKET OR GENERAL STORE CONSECUTIVE GRAPHICS	YOU CAN BUY EGGS AT A GENERAL STORE OR SUPERMARKET RIGHT? YOU CAN BUY SO MANY OTHER THINGS TOO. LIKE FISH, MEAT, MEALIE MEAL AND SUGAR, FRUIT AND VEGETABLES, BREAD, MILK AND CHEESE.

shot	camera	video	audio
		HUMPTY DUMPTY - LIFESIZE SITS ON WALL MADE OUT OF BOXES H.D. FALLS KINGS MEN AND KINGS HORSES BROKEN H.D.	DO YOU KNOW THE OLD NURSERY RHYME. HUMPTY DUMPTY SAT ON A WALL H.D. HAD A GREAT FALL ALL THE KINGS HORSES AND ALL THE KINGS MEN COULD'NT PUT HUMPTY TOGETHER AGAIN.
		H.D. SITS ON WALL SAME 3 GET TOGETHER TO PUT WALL TOGETHER	NOW HERE'S A DIFFERENT VERSION TO THAT NURSERY RHYME. IT'S MY OWN NURSERY RHYME. H.D. SAT IN FRONT OF THE WALL. H.D. SAW THE WALL TAKE A FALL. ALL THE KINGS HORSES AND ALL THE KINGS MEN COULD'NT PUT THE WALL TOGETHER AGAIN.
		PAN ONTO H.D. CHUCKLING AT THEIR DIFFICULTY.	
		H.D. HOLDING GRAPHICS G.I. GRAPHIC	HEY I WANT TO TELL YOU ABOUT SOME OF MY FRIENDS, G, H AND I. THEY BELONG TO THE ALPHABET AND WE FIND THEM AT THE BEGINNING OF WORDS LIKE GARDEN, HEN, IRON
		H.D. AND PAN ONTO GEN. G. (3RD GRAPHIC)	HERE'S GENERAL G.

EDUCATIONAL TECHNOLOGY UNIT

PROGRAMME 3. BRIGHT RIDES

shot	camera	video	audio
		GEN. G. MOVES MOUSTACHE WITH VOICE SLIDE WITH G. STUCK ON GRAPHICS	HELLO MY NAME'S GEN. G. I WORK IN THE GARDEN AND LOOK AFTER THE GRASS. I OPEN AND CLOSE THE GATE. MY FRIENDS ARE GARY GOAT AND GAYLE GOOSE I ENJOY EATING GRAPES AND GEWEY GUM.
		HELEN HEN (FEATHER IN TAIL) SHOWS HEAD AND HAT	HI, I'M HELEN HEN. THIS IS MY HEAD AND THIS IS MY HAT HEAD AND HAT BOTH START WITH H.
		GRAPHIC	I LIVE ON A HILL IN A HUT AND MY FRIEND IS HARRY THE HORSE
		3d GRAPHIC ARM SCRATCHES WITH SWIVEL PIN GRAPHIC ITCHY I GRAPHIC GRAPHIC	HI, I'M ITCHY I LIVE ON ICE AND WHEN I ITCH I SCRATCH MYSELF I LIKE EATING ICE CREAM I IRON MY CLOTHES WITH AN IRON EVERY DAY.

shot	camera	video	audio
		ANIMATED GRAPHICS 2 PRESENTERS NAME THE ITEMS	ONE BOY TWO GIRLS THREE DOGS FOUR CARS FIVE HOUSES SIX CATS SEVEN STARS EIGHT TREES NINE CANDLES TEN FINGERS
		REPEAT SEQUENCE	
		PUPPET GRAPHIC	DO YOU REMEMBER ALL THE LETTERS WE'VE LEARNT SO FAR A FOR APPLE B FOR BROOM C FOR CLOWN D FOR DOG E FOR EAR F FOR FENCE G FOR GATE H FOR HEN I FOR ICE

EDUCATIONAL TECHNOLOGY UNIT

PROGRAMME

BRIGHT RIDES

shot	camera	video	audio
		HUMPTY DUMPTY (H. & D.) GRAPHIC	HI, I'M BACK WITH ANOTHER RHYME H.D. WAS A LARGE OLD EGG H.D. SHOOK HIS LEFT AND HIS RIGHT LEG HE THREW HIS ARMS UP TO THE SKY THINKING HE WOULD BE ABLE TO FLY BUT H.D. HAD A GREAT FALL FROM OFF HIS PLACE ON THE WALL AND ALL THE KINGS HORSES AND ALL THE KINGS MEN COULD'NT PUT HUMPTY TOGETHER AGAIN.
		PRESENTER	H.D. SHOWED US THAT WE HAVE TWO LEGS AND TWO ARMS THAT'S ALL FOR NOW SEE YOU SOON.

APPENDIX A2 Editing of Programme 3.

VISION	INSERT NO	CONTENT	DUR	SOUND
Film on tape push-cart	3-6	SONG: "Come along, come along .... Bright Rides run."	33"	mute film grams song
VTR	2-32	Avril: "Hello, look at this .... here is a game, now watch carefully."	1'57"	VTR
VTR	2-14	Rahleen: "Now here is a game, watch carefully .... you may eat the biscuit."	1'35"	VTR
Film on tape Supermarket		"You may have some chickens .... Bread, milk and cheese."		mute film sound fx.
VTR	1-4	H. Dumpty: "Do you know the old nursery rhyme ..... its my own nursery rhyme."	36"	VTR
VTR	1-6	H. Dumpty: "H.D. sat in front of the wall ..... couldn't put the wall together again."	25"	VTR
VTR	2-19	H. Dumpty: "Hey I want to tell you .... here is general G."	45"	VTR

Editing of Programme 3 cont.

VISION	INSERT NO	CONTENT	DUR	SOUND
VTR	1-13	"Here is general G ..... I iron my clothes with an iron every day."	1'14"	VTR
VTR	3-1	"One boy, 2 girls, 3 dogs ..... 9 candles, 10 fingers."	58"	VTR
VTR	3-2	"A for apple, B for broom ..... I for iron."	52"	VTR
	2-42	a...b...c... g...h...i...		
VTR	3-11	Avril: "H. Dumpty showed us that ..... see you soon."	16"	VTR
Film on tape pushcart	3-5	"Come along, come along .... Bright Rides run."	33"	Mute film grams song

APPENDIX A3

MEANS, STANDARD DEVIATIONS, VARIATIONS AND RANGES

CONTROL GROUP

Variable		No. of Cases	Mean	Standard Deviation	Kurtosis	Skewness	Minimum	Maximum
Body Parts	Pretest	70	13,614	3,329	-0,254	-0,309	5,00	20,00
	Posttest	70	14,657	3,737	0,663	-0,572	3,00	20,00
Geometric Forms	Pretest	70	1,871	1,493	-1,291	0,280	0,00	5,00
	Posttest	70	2,186	1,975	-1,292	0,334	0,00	6,00
Identifying Community members and places	Pretest	70	2,571	1,923	-1,003	0,322	0,00	6,00
	Posttest	70	2,414	1,672	-0,753	0,211	0,00	6,00
Matching	Pretest	70	1,371	1,144	-0,638	0,356	0,00	4,00
	Posttest	70	1,614	1,081	-0,801	0,121	0,00	4,00
Letters	Pretest	70	1,071	1,265	0,450	0,532	0,00	5,00
	Posttest	70	0,629	1,310	1,245	0,278	0,00	8,00
Numbers	Pretest	70	18,871	6,174	-0,652	0,077	0,00	45,00
	Posttest	70	17,543	6,906	-0,537	0,314	0,00	45,00
Relational Terms	Pretest	70	5,443	2,275	-0,289	-0,628	0,00	8,00
	Posttest	70	4,829	2,309	-0,566	-0,686	0,00	8,00
Classifying	Pretest	70	1,814	1,582	-0,985	0,383	0,00	5,00
	Posttest	70	2,171	1,993	-1,155	0,413	0,00	6,00
Sorting	Pretest	70	1,029	0,868	1,195	0,903	0,00	4,00
	Posttest	70	1,114	0,910	0,062	0,482	0,00	4,00
Parts of Whole	Pretest	70	1,986	1,313	-1,168	-0,092	0,00	4,00
	Posttest	70	1,600	1,323	-1,255	0,202	0,00	4,00
Emotions	Pretest	70	1,314	0,753	-0,989	-0,596	0,00	2,00
	Posttest	70	1,443	0,694	-0,462	-0,569	0,00	2,00
Attitudes (Happy)	Pretest	70	5,957	2,281	0,791	-0,214	0,00	8,00
	Posttest	70	6,257	2,090	1,823	-0,906	0,00	8,00
Attitudes (Sad)	Pretest	70	1,528	1,878	1,166	0,406	0,00	8,00
	Posttest	70	1,143	1,417	1,463	1,376	0,00	6,00
Total (Mt)	Pretest	70	50,957	10,092	-0,546	-0,559	5,00	80,00
	Posttest	70	50,214	11,847	-0,656	-0,254	11,00	89,00
Peabody (PPVT)	Pretest	70	74,414	13,508	-0,893	-0,090	47,00	102,00
	Posttest	70	73,929	14,639	-0,547	-0,218	40,00	103,00
Draw a Person (DAP)	Pretest	70	4,158	1,624	1,348	-0,569	0,00	8,00
	Posttest	70	4,034	1,719	0,871	-0,494	0,00	7,00

APPENDIX A4

MEANS, STANDARD DEVIATIONS, VARIATIONS AND RANGES

EXPERIMENTAL GROUP

Variable		No. of Cases	Mean	Standard Deviation	Kurtosis	Skewness	Minimum	Maximum
Body Parts	Pretest	70	14,185	3,712	-0,901	-0,436	5,00	20,00
	Posttest	70	16,457	3,374	-0,386	-0,482	8,00	20,00
Geometric Forms	Pretest	70	2,343	1,817	-1,027	0,350	0,00	6,00
	Posttest	70	3,471	2,076	-1,171	-0,378	0,00	6,00
Identifying Community members and places	Pretest	70	2,928	1,812	-0,840	0,335	0,00	7,00
	Posttest	70	3,086	1,717	0,578	0,517	0,00	9,00
Matching	Pretest	70	1,271	0,947	-0,906	0,163	0,00	3,00
	Posttest	70	1,857	1,243	-0,927	0,139	0,00	4,00
Letters	Pretest	70	0,771	1,265	0,598	0,951	0,00	5,00
	Posttest	70	0,900	1,395	0,478	0,733	0,00	6,00
Numbers	Pretest	70	20,257	6,394	-1,072	-0,079	1,00	39,00
	Posttest	70	23,800	6,361	-0,972	-0,162	3,00	45,00
Relational Terms	Pretest	70	5,686	1,602	-0,009	-0,555	1,00	8,00
	Posttest	70	5,600	1,697	-0,065	-0,644	1,00	8,00
Classifying	Pretest	70	1,614	1,796	-0,564	0,467	0,00	6,00
	Posttest	70	2,829	1,941	-1,102	-0,069	0,00	7,00
Sorting	Pretest	70	1,057	0,849	-0,645	0,328	0,00	3,00
	Posttest	70	1,400	1,095	-1,004	0,161	0,00	4,00
Parts of Whole	Pretest	70	2,129	1,141	-0,935	0,042	0,00	4,00
	Posttest	70	1,986	1,186	-0,822	0,028	0,00	4,00
Emotions	Pretest	70	1,500	0,631	-0,211	-0,489	0,00	2,00
	Posttest	70	1,743	0,502	1,090	-0,820	0,00	2,00
Attitudes (Happy)	Pretest	70	5,586	2,748	-0,426	-0,924	0,00	8,00
	Posttest	70	6,314	2,262	1,302	-0,463	0,00	8,00
Attitudes (Sad)	Pretest	70	1,971	2,576	0,263	1,195	0,00	8,00
	Posttest	70	1,429	2,110	1,064	1,671	0,00	8,00
Total (Mt)	Pretest	70	53,743	12,774	-0,954	-0,102	20,00	83,00
	Posttest	70	63,271	15,427	-0,877	-0,115	25,00	98,00
Peabody (PPVT)	Pretest	70	71,543	12,452	0,261	-0,719	35,00	94,00
	Posttest	70	76,043	13,987	-0,455	-0,315	45,00	107,00
Draw a Person (DAP)	Pretest	70	4,354	1,108	0,894	-0,546	0,00	7,09
	Posttest	70	4,730	1,039	0,446	0,564	3,00	8,00

APPENDIX B1.1 MEANS OF PRETEST AND POSTTEST SCORES OF CHILDREN FROM THREE CHILD CARE CENTRES IN CONTROL AND EXPERIMENTAL GROUPS

	Control Pretest			Control Posttest			Experimental Pretest			Experimental Posttest		
	J	D	HR	J	D	HR	J	D	HR	J	D	HR
No of Ss in each group	25	23	22	25	23	22	24	21	25	24	21	25
Body Parts	13,96	12,83	14,05	15,52	13,57	14,82	13,71	14,05	14,76	16,42	15,38	17,40
Geometric Forms	1,48	2,04	2,14	1,60	2,52	2,50	2,17	2,62	2,28	3,25	3,19	3,92
Identifying	2,56	2,43	2,73	2,44	2,30	2,50	2,92	2,29	3,48	3,25	2,81	3,16
Matching	1,16	1,09	1,91	1,60	1,17	2,09	1,29	1,48	1,08	1,79	1,81	1,96
Letters	0,96	0,78	1,50	0,68	0,22	1,00	0,58	0,86	0,88	1,04	0,86	0,80
Numbers	19,32	14,74	25,82	17,08	11,87	24,00	21,17	16,19	22,80	24,83	20,24	25,80
Relational Terms	5,56	4,35	6,45	4,80	4,48	5,23	5,13	5,57	6,32	5,25	5,05	6,40
Classifying	1,68	1,30	2,50	1,88	1,57	3,14	1,71	2,05	1,16	2,88	2,71	2,88
Sorting	1,00	0,87	1,23	0,76	1,13	1,50	0,92	1,00	1,24	1,04	1,57	1,60
Parts of Whole	2,24	1,52	2,18	1,40	1,48	1,95	2,00	1,95	2,40	2,04	1,81	2,08
Emotions	1,40	1,13	1,41	1,40	1,22	1,73	1,67	1,24	1,56	1,83	1,71	1,68
Attitudes Happy	5,84	5,83	6,23	5,24	6,30	7,36	5,04	5,29	6,36	5,96	6,38	6,60
Attitudes Sad	1,24	1,74	1,64	1,64	1,30	0,41	2,64	1,57	1,56	1,92	1,05	1,28
Total	51,96	46,09	61,91	49,16	41,52	60,50	53,25	49,29	59,96	63,63	57,14	68,08
PPVT	74,44	75,74	69.05	81,48	75,65	63,55	71,88	72,86	72,04	79,79	78,76	70,16
DAP	3,83	3,77	4,94	3,79	3,56	4,81	4,33	3,80	4,76	4,67	4,47	5,01

Key: J = Jubilee Creche, D = Dorkas Creche, HR = Holy Rosary Nursery School.

APPENDIX B1.2 MEANS OF PRETEST AND POSTTEST SCORES OF MALE AND FEMALE CHILDREN IN CONTROL AND EXPERIMENTAL GROUPS

	Control Pretest		Control Posttest		Experimental Pretest		Experimental Posttest	
	Male	Female	Male	Female	Male	Female	Male	Female
No of Ss in each group	39	31	39	31	34	36	34	36
Body Parts	13,69	13,52	14,67	14,65	14,23	14,13	16,18	16,72
Geometric Forms	2,23	1,42	2,49	1,81	2,29	2,39	3,56	3,39
Identifying	2,90	2,16	2,59	2,19	2,91	2,94	2,94	3,22
Matching	1,46	1,26	1,49	1,77	1,06	1,47	1,79	1,92
Letters	0,90	1,29	0,59	0,68	0,68	0,86	0,79	1,00
Numbers	17,10	21,10	16,05	19,42	17,21	23,14	21,15	26,31
Relational Terms	5,70	5,13	5,10	4,48	5,53	5,83	5,50	5,69
Classifying	1,97	1,61	2,23	2,10	1,56	1,67	2,71	2,94
Sorting	1,08	0,97	1,18	1,03	0,94	1,17	1,26	1,53
Parts of Whole	2,23	1,68	1,77	1,39	1,94	2,31	2,03	1,94
Emotions	1,41	1,19	1,51	1,36	1,56	1,44	1,77	1,72
Attitudes Happy	5,87	6,06	6,41	6,07	5,68	6,50	6,32	6,31
Attitudes Sad	1,74	1,26	1,05	1,26	1,97	1,97	1,35	1,50
Total	50,67	54,32	49,69	50,87	49,91	57,36	59,97	66,39
PPVT	73,77	75,23	74,00	73,84	71,06	72,00	76,88	75,25
DAP	4,21	4,10	4,17	3,86	4,10	4,60	4,51	4,94

APPENDIX B2.1 MEANS OF PRETEST AND POSTTEST SCORES OF CHILDREN FROM THREE AGE GROUPS, IN CONTROL AND EXPERIMENTAL GROUPS

	Control Pretest			Control Posttest			Experimental Pretest			Experimental Posttest		
	4	5	6	4	5	6	4	5	6	4	5	6
No of Ss in each group	20	28	22	20	28	22	18	25	27	18	25	27
Body Parts	11,20	14,71	14,41	12,00	15,68	15,77	12,00	14,30	14,86	13,25	16,57	17,49
Geometric Forms	0,90	2,11	2,45	1,05	2,86	2,36	1,83	1,96	2,77	2,17	2,78	4,37
Identifying	1,30	3,18	2,95	1,55	2,82	2,68	1,50	2,91	3,43	1,17	3,04	3,77
Matching	0,60	1,54	1,86	0,90	1,75	2,09	0,67	1,09	1,60	0,83	1,57	2,40
Letters	0,30	1,18	1,64	0,60	0,43	0,91	0,09	0,57	1,14	0,92	0,87	0,91
Numbers	8,75	21,89	24,22	6,75	20,32	23,82	5,48	10,76	20,43	11,58	22,43	28,89
Relational Terms	3,30	6,14	6,50	3,85	5,25	5,16	4,92	5,43	6,11	4,00	5,74	6,06
Classifying	0,90	2,07	2,32	1,20	2,18	3,05	0,92	1,35	2,03	1,75	2,65	3,31
Sorting	0,85	0,89	1,36	0,70	1,14	1,45	0,50	1,13	1,20	1,00	1,09	1,74
Parts of Whole	1,50	2,21	2,14	0,70	1,96	1,95	1,42	2,04	2,43	1,17	1,87	2,34
Emotions	1,10	1,46	1,32	1,30	1,36	1,68	1,17	1,44	1,66	1,58	1,74	1,80
Attitudes Happy	5,40	5,75	6,73	5,35	6,57	6,68	3,25	6,00	6,11	5,08	6,48	6,63
Attitudes Sad	1,15	2,11	1,14	1,00	1,29	1,09	3,42	1,91	1,51	2,00	1,44	1,23
Total	30,70	57,39	61,18	30,60	55,79	60,96	33,33	52,04	61,86	39,42	60,35	73,37
PPVT	76,30	75,82	67,27	80,10	74,00	68,23	74,83	76,30	68,66	80,17	77,48	73,69
DAP	2,48	4,46	5,30	2,27	4,47	5,08	3,20	4,26	4,81	3,70	4,56	5,19

key: (4) = 3 yrs 3 months to 4 yrs 4 months; (5) = 4 yrs 5 months to 5 yrs 6 months;
(6) = 5 yrs 7 months to 6 yrs 8 months.

APPENDIX B2.2 MEANS OF PRETEST AND POSTTEST SCORES OF ENGLISH AND AFRIKAANS SPEAKING CHILDREN IN CONTROL AND EXPERIMENTAL GROUPS

	Control Pretest		Control Posttest		Experimental Pretest		Experimental Posttest	
	Eng.	Afrik.	Eng.	Afrik.	Eng.	Afrik.	Eng.	Afrik.
No of Ss in each group	50	17	50	17	47	22	47	22
Body Parts	14,02	12,23	15,22	12,41	13,68	15,18	16,09	17,09
Geometric Forms	1,92	1,88	2,05	2,59	2,06	3,06	3,13	4,27
Identifying	2,68	2,12	2,50	2,00	2,81	3,14	3,04	3,14
Matching	1,34	1,53	1,60	1,59	1,20	1,27	1,94	1,77
Letters	1,02	1,12	0,68	0,18	0,85	0,64	1,06	0,55
Numbers	18,38	19,65	16,82	18,06	19,23	22,04	23,04	25,18
Relational Terms	5,40	5,18	4,88	4,41	5,34	6,55	5,49	5,91
Classifying	1,80	1,59	2,16	1,94	1,57	1,73	2,62	3,23
Sorting	1,04	0,94	1,04	1,47	1,02	1,18	1,23	1,82
Parts of Whole	2,05	1,65	1,64	1,29	1,96	2,41	1,89	2,27
Emotions	1,30	1,29	1,42	1,47	1,55	1,36	1,79	1,64
Attitudes Happy	6,18	5,18	6,10	6,47	5,36	5,95	6,36	6,14
Attitudes Sad	1,20	2,53	1,26	1,00	2,19	1,59	1,38	1,59
Total	50,96	53,18	50,04	47,41	51,36	58,55	61,32	67,32
PPVT	74,02	69,29	76,94	64,94	70,79	72,59	78,45	70,91
DAP	4,01	4,26	3,90	4,15	4,30	4,49	4,71	4,81

APPENDIX B3 MEANS OF PRETEST AND POSTTEST SCORES OF REGULAR TELEVIEWERS (TV) AND RARE TELEVIEWERS (NO TV) IN CONTROL AND EXPERIMENTAL GROUPS

	Control Pretest		Control Posttest		Experimental Pretest		Experimental Posttest	
	TV	NO TV	TV	NO TV	TV	NO TV	TV	NO TV
No of Ss in each group	50	20	50	20	46	24	46	24
Body Parts	13,54	13,80	14,56	14,90	14,07	14,42	16,22	16,92
Geometric Forms	2,08	1,35	2,52	1,35	2,24	2,54	3,61	3,21
Identifying	2,46	2,85	2,28	2,75	2,87	3,04	3,04	3,17
Matching	1,28	1,60	1,54	1,80	1,22	1,38	1,87	1,83
Letters	0,88	1,55	0,50	0,95	0,78	0,75	0,91	0,88
Numbers	17,82	21,50	17,36	18,00	20,48	19,83	23,61	24,17
Relational Terms	5,24	5,95	4,78	4,95	5,61	5,83	5,52	5,75
Classifying	1,68	2,15	2,06	2,45	1,83	1,21	2,93	2,63
Sorting	0,98	1,15	1,10	1,15	1,07	1,04	1,44	1,33
Parts of Whole	1,94	2,10	1,68	1,40	2,07	2,25	1,91	2,13
Emotions	1,26	1,45	1,38	1,60	1,54	1,42	1,74	1,75
Attitudes Happy	5,78	6,40	6,08	6,70	5,39	5,96	6,28	6,38
Attitudes Sad	1,74	1,00	1,24	0,90	1,98	1,96	1,37	1,54
Total	49,16	55,45	49,78	51,30	53,76	53,71	63,02	63,75
PPVT	75.72	71,15	75,70	69,50	72,91	68,92	78,35	71,63
DAP	4,11	4,28	4,01	4,09	4,38	4,30	4,80	4,59

APPENDIX B4.1 ANALYSIS OF COVARIANCE OF POSTTEST SCORES WITH PRETEST SCORES AS COVARIATES

	Control Group			Experimental Group			
BODY PARTS	df	F	SIGNIF OF F	BODY PARTS	df	F	SIGNIF OF F
Main Effects	8	1.628	0.160	Main Effects	8	2.890	0.015
*Crèche differences	2	1.048	0.364	Crèche differences	2	2.466	0.101
Sex differences	1	0.053	0.820	Sex differences	1	2.834	0.102
Age differences	2	2.636	0.089	Age differences	2	6.077	0.006
Language differences	2	3.009	0.065	Language differences	2	0.603	0.553
Televiewing differences	1	0.100	0.754	Televiewing differences	1	0.012	0.914
2-Way Interactions	20	1.299	0.255	2-Way Interactions	18	2.002	0.042
Crèche by Sex	2	1.861	0.174	Crèche by Sex	2	6.802	0.003
Crèche by Age	3	0.964	0.423	Crèche by Age	3	5.079	0.003
Crèche by Language	3	1.087	0.370	Crèche by Language	2	3.441	0.044
Crèche by Televiewing	2	0.336	0.717	Crèche by Televiewing	2	1.669	0.204
Sex by Age	2	2.356	0.113	Sex by Age	2	0.514	0.603
Sex by Language	2	1.109	0.344	Sex by Language	1	7.761	0.009
Sex by Televiewing	1	0.276	0.603	Sex by Televiewing	1	0.296	0.590
Age by Language	2	5.436	0.010	Age by Language	2	2.170	0.131
Age by Televiewing	2	1.120	0.340	Age by Televiewing	2	2.671	0.085
Language by Televiewing	1	1.446	0.239	Language by Televiewing	1	2.278	0.141
3-Way Interactions	11	0.216	0.995	3-Way Interactions	10	1.010	0.456
Crèche by Sex by Age	3	0.216	0.885	Crèche by Sex by Age	3	0.459	0.713
Crèche by Sex by Language	1	0.105	0.748	Crèche by Sex by Language	1	0.010	0.923
Crèche by Sex by Televiewing	2	0.106	0.900	Crèche by Sex by Televiewing	1	0.422	0.521
Crèche by Age by Language	2	0.178	0.838	Crèche by Age by Language	1	0.087	0.770
Crèche by Age by Televiewing	1	0.072	0.791	Crèche by Age by Televiewing	2	0.825	0.448
Sex by Age by Language	1	0.001	0.979	Sex by Age by Language	1	0.005	0.944
Sex by Age by Televiewing	1	0.166	0.687	Sex by Age by Televiewing	1	0.200	0.658

APPENDIX B4.2 ANALYSIS OF COVARIANCE OF POSTTEST SCORES WITH PRETEST SCORES AS COVARIATES

	Control Group			Experimental Group			
GEOMETRIC FORMS	df	F	SIGNIF OF F	GEOMETRIC FORMS	df	F	SIGNIF OF F
Main Effects	8	1.785	0.121	Main Effects	8	2.768	0.018
*Crèche differences	2	0.405	0.671	Crèche differences	2	1.527	0.233
Sex differences	1	0.452	0.506	Sex differences	1	0.015	0.902
Age differences	2	3.666	0.038	Age differences	2	5.393	0.010
Language differences	2	0.934	0.405	Language differences	2	0.403	0.672
Televiewing differences	1	3.278	0.081	Televiewing differences	1	6.033	0.020
2-Way Interactions	20	0.718	0.778	2-Way Interactions	18	0.819	0.666
Crèche by Sex	2	0.411	0.667	Crèche by Sex	2	0.110	0.897
Crèche by Age	3	0.508	0.680	Crèche by Age	3	0.720	0.548
Crèche by Language	3	0.518	0.673	Crèche by Language	2	0.462	0.634
Crèche by Televiewing	2	1.268	0.297	Crèche by Televiewing	2	2.308	0.116
Sex by Age	2	0.071	0.931	Sex by Age	2	0.442	0.646
Sex by Language	2	0.043	0.958	Sex by Language	1	0.156	0.696
Sex by Televiewing	1	0.270	0.609	Sex by Televiewing	1	0.087	0.770
Age by Language	2	0.320	0.723	Age by Language	2	0.088	0.916
Age by Televiewing	2	0.452	0.641	Age by Televiewing	2	0.453	0.640
Language by Televiewing	1	0.888	0.354	Language by Televiewing	1	0.120	0.732
3-Way Interactions	11	1.696	0.124	3-Way Interactions	10	1.676	0.130
Crèche by Sex by Age	3	0.355	0.786	Crèche by Sex by Age	3	0.733	0.540
Crèche by Sex by Language	1	3.932	0.057	Crèche by Sex by Language	1	4.194	0.049
Crèche by Sex by Televiewing	2	2.359	0.112	Crèche by Sex by Televiewing	1	0.104	0.749
Crèche by Age by Language	2	1.474	0.246	Crèche by Age by Language	1	6.157	0.019
Crèche by Age by Televiewing	1	2.820	0.103	Crèche by Age by Televiewing	2	0.129	0.879
Sex by Age by Language	1	4.199	0.050	Sex by Age by Language	1	3.054	0.090
Sex by Age by Televiewing	1	2.094	0.160	Sex by Age by Televiewing	1	0.013	0.909

*Crèche differences refers to differences between the three child care centres, Jubilee, Dorkas and Holy Rosary Nursery school

- Underlined F scores are significant at the 0,5 level of significance.

APPENDIX B4.3 ANALYSIS OF COVARIANCE OF POSTTEST SCORES WITH PRETEST SCORES AS COVARIATES

	Control Group				Experimental Group			
	df	F	SIGNIF OF F		df	F	SIGNIF OF F
IDENTIFYING				IDENTIFYING			
Main Effects	8	0.240	0.980	Main Effects	8	3.065	0.011
*Crèche differences	2	0.183	0.833	Crèche differences	2	2.255	0.121
Sex differences	1	0.000	0.984	Sex differences	1	1.343	0.255
Age differences	2	0.343	0.713	Age differences	2	11.025	0.000
Language differences	2	0.305	0.740	Language differences	2	0.179	0.837
Televiewing differences	1	0.765	0.389	Televiewing differences	1	0.063	0.804
2-Way Interactions	20	1.105	0.395	2-Way Interactions	18	1.266	0.273
Crèche by Sex	2	0.522	0.599	Crèche by Sex	2	0.118	0.889
Crèche by Age	3	1.989	0.138	Crèche by Age	3	0.732	0.540
Crèche by Language	3	0.141	0.934	Crèche by Language	2	1.396	0.262
Crèche by Televiewing	2	0.430	0.655	Crèche by Televiewing	2	0.885	0.423
Sex by Age	2	1.876	0.171	Sex by Age	2	1.416	0.257
Sex by Language	2	0.932	0.405	Sex by Language	1	2.221	0.146
Sex by Televiewing	1	0.122	0.729	Sex by Televiewing	1	7.586	0.010
Age by Language	2	0.198	0.822	Age by Language	2	0.438	0.649
Age by Televiewing	2	2.956	0.068	Age by Televiewing	2	0.246	0.784
Language by Televiewing	1	0.979	0.331	Language by Televiewing	1	0.263	0.612
3-Way Interactions	11	0.728	0.703	3-Way Interactions	10	1.198	0.329
Crèche by Sex by Age	3	0.902	0.452	Crèche by Sex by Age	3	0.341	0.796
Crèche by Sex by Language	1	2.427	0.130	Crèche by Sex by Language	1	0.021	0.886
Crèche by Sex by Televiewing	2	0.726	0.492	Crèche by Sex by Televiewing	1	0.298	0.589
Crèche by Age by Language	2	0.753	0.480	Crèche by Age by Language	1	5.565	0.025
Crèche by Age by Televiewing	1	0.364	0.551	Crèche by Age by Televiewing	2	0.256	0.774
Sex by Age by Language	1	3.078	0.090	Sex by Age by Language	1	0.499	0.485
Sex by Age by Televiewing	1	0.601	0.444	Sex by Age by Televiewing	1	0.547	0.465

APPENDIX B4.4 ANALYSIS OF COVARIANCE OF POSTTEST SCORES WITH PRETEST SCORES AS COVARIATES

	Control Group				Experimental Group			
	df	F	SIGNIF OF F		df	F	SIGNIF OF F
MATCHING				MATCHING			
Main Effects	8	1.888	0.101	Main Effects	8	1.689	0.097
* Crèche differences	2	1.098	0.347	Crèche differences	2	0.631	0.539
Sex differences	1	3.220	0.083	Sex differences	1	0.285	0.597
Age differences	2	2.986	0.066	Age differences	2	3.868	0.031
Language differences	2	0.191	0.827	Language differences	2	2.281	0.119
Televiewing differences	1	0.000	0.991	Televiewing differences	1	0.717	0.403
2-Way Interactions	20	1.084	0.413	2-Way Interactions	18	0.805	0.681
Crèche by Sex	2	0.390	0.681	Crèche by Sex	2	0.833	0.444
Crèche by Age	3	0.244	0.865	Crèche by Age	3	0.338	0.798
Crèche by Language	3	1.509	0.233	Crèche by Language	2	0.152	0.859
Crèche by Televiewing	2	0.573	0.570	Crèche by Televiewing	2	0.102	0.903
Sex by Age	2	0.137	0.872	Sex by Age	2	0.739	0.485
Sex by Language	2	2.441	0.105	Sex by Language	1	0.750	0.393
Sex by Televiewing	1	1.723	0.200	Sex by Televiewing	1	0.000	0.964
Age by Language	2	0.851	0.437	Age by Language	2	0.128	0.880
Age by Televiewing	2	1.859	0.174	Age by Televiewing	2	1.716	0.196
Language by Televiewing	1	0.963	0.335	Language by Televiewing	1	0.168	0.684
3-Way Interactions	11	2.241	0.040	3-Way Interactions	10	0.832	0.602
Crèche by Sex by Age	3	1.480	0.241	Crèche by Sex by Age	3	0.265	0.850
Crèche by Sex by Language	1	3.095	0.089	Crèche by Sex by Language	1	0.129	0.722
Crèche by Sex by Televiewing	2	1.608	0.218	Crèche by Sex by Televiewing	1	0.446	0.509
Crèche by Age by Language	2	3.498	0.044	Crèche by Age by Language	1	1.787	0.191
Crèche by Age by Televiewing	1	1.779	0.193	Crèche by Age by Televiewing	2	0.173	0.842
Sex by Age by Language	1	17.272	0.000	Sex by Age by Language	1	3.766	0.061
Sex by Age by Televiewing	1	3.290	0.080	Sex by Age by Televiewing	1	0.071	0.792

* crèche differences refers to differences between the three child care centres, Jubilee, Dorkas and Holy Rosary Nursery school.

- Underlined F scores are significant at the 0,5 level of significance.

APPENDIX B4.5 ANALYSIS OF COVARIANCE OF POSTTEST SCORES WITH PRETEST SCORES AS COVARIATES

	Control Group			Experimental Group			
LETTERS	df	F	SIGNIF OF F	LETTERS	df	F	SIGNIF OF F
Main Effects	8	2.359	0.043	Main Effects	8	0.440	0.888
*Crèche differences	2	2.045	0.148	Crèche differences	2	0.229	0.796
Sex differences	1	0.117	0.735	Sex differences	1	0.172	0.681
Age differences	2	3.194	0.056	Age differences	2	0.409	0.668
Language differences	2	5.591	0.009	Language differences	2	0.491	0.616
Televiewing differences	1	0.030	0.864	Televiewing differences	1	0.095	0.760
2-Way Interactions	20	1.815	0.070	2-Way Interactions	18	1.555	0.134
Crèche by Sex	2	0.394	0.678	Crèche by Sex	2	2.151	0.153
Crèche by Age	3	1.017	0.399	Crèche by Age	3	0.924	0.440
Crèche by Language	3	2.421	0.086	Crèche by Language	2	1.305	0.285
Crèche by Televiewing	2	0.790	0.463	Crèche by Televiewing	2	0.777	0.468
Sex by Age	2	0.003	0.997	Sex by Age	2	4.527	0.019
Sex by Language	2	4.011	0.029	Sex by Language	1	0.402	0.530
Sex by Televiewing	1	3.021	0.093	Sex by Televiewing	1	0.148	0.703
Age by Language	2	0.771	0.472	Age by Language	2	0.126	0.882
Age by Televiewing	2	1.214	0.312	Age by Televiewing	2	1.760	0.188
Language by Televiewing	1	0.168	0.685	Language by Televiewing	1	0.000	0.990
3-Way Interactions	11	0.774	0.662	3-Way Interactions	10	0.925	0.524
Crèche by Sex by Age	3	0.316	0.814	Crèche by Sex by Age	3	1.203	0.325
Crèche by Sex by Language	1	1.363	0.253	Crèche by Sex by Language	1	0.138	0.713
Crèche by Sex by Televiewing	2	0.143	0.867	Crèche by Sex by Televiewing	1	1.145	0.293
Crèche by Age by Language	2	0.743	0.485	Crèche by Age by Language	1	0.317	0.578
Crèche by Age by Televiewing	1	0.001	0.980	Crèche by Age by Televiewing	2	0.054	0.948
Sex by Age by Language	1	1.948	0.173	Sex by Age by Language	1	0.091	0.765
Sex by Age by Televiewing	1	0.074	0.787	Sex by Age by Televiewing	1	0.665	0.421

APPENDIX B4.6 ANALYSIS OF COVARIANCE OF POSTTEST SCORES WITH PRETEST SCORES AS COVARIATES

	Control Group			Experimental Group			
NUMBERS	df	F	SIGNIF OF F	NUMBERS	df	F	SIGNIF OF F
Main Effects	8	0.880	0.545	Main Effects	8	0.693	0.695
* Crèche differences	2	0.070	0.933	Crèche differences	2	0.168	0.846
Sex differences	1	0.020	0.888	Sex differences	1	0.040	0.843
Age differences	2	1.235	0.306	Age differences	2	2.059	0.144
Language differences	2	0.837	0.443	Language differences	2	0.130	0.878
Televiewing differences	1	1.531	0.226	Televiewing differences	1	0.537	0.469
2-Way Interactions	20	0.750	0.746	2-Way Interactions	18	0.648	0.834
Crèche by Sex	2	0.212	0.810	Crèche by Sex	2	0.595	0.557
Crèche by Age	3	0.188	0.903	Crèche by Age	3	0.597	0.622
Crèche by Language	3	1.137	0.350	Crèche by Language	2	1.211	0.311
Crèche by Televiewing	2	0.288	0.752	Crèche by Televiewing	2	1.017	0.373
Sex by Age	2	0.136	0.874	Sex by Age	2	0.089	0.915
Sex by Language	2	2.496	0.100	Sex by Language	1	2.747	0.107
Sex by Televiewing	1	0.111	0.741	Sex by Televiewing	1	0.001	0.973
Age by Language	2	1.342	0.277	Age by Language	2	0.303	0.740
Age by Televiewing	2	0.181	0.835	Age by Televiewing	2	0.685	0.511
Language by Televiewing	1	1.232	0.276	Language by Televiewing	1	0.023	0.881
3-Way Interactions	11	0.706	0.723	3-Way Interactions	10	0.787	0.641
Crèche by Sex by Age	3	0.250	0.860	Crèche by Sex by Age	3	1.392	0.263
Crèche by Sex by Language	1	0.019	0.891	Crèche by Sex by Language	1	0.135	0.716
Crèche by Sex by Televiewing	2	0.728	0.491	Crèche by Sex by Televiewing	1	0.019	0.891
Crèche by Age by Language	2	0.949	0.161	Crèche by Age by Language	1	0.333	0.568
Crèche by Age by Televiewing	1	0.713	0.406	Crèche by Age by Televiewing	2	2.410	0.106
Sex by Age by Language	1	0.002	0.967	Sex by Age by Language	1	0.947	0.338
Sex by Age by Televiewing	1	0.020	0.888	Sex by Age by Televiewing	1	0.098	0.756

* crèche differences refers to differences between the three child care centres, Jubilee, Dorkas and Holy Rosary Nursery school.

Underlined F scores are significant at the 0,5 level of significance.

APPENDIX B4.7 ANALYSIS OF COVARIANCE OF POSTTEST SCORES WITH PRETEST SCORES AS COVARIATES

	Control Group			Experimental Group			
	df	F	SIGNIF OF F		df	F	SIGNIF OF F
RELATIONAL TERMS				RELATIONAL TERMS			
Main Effects	8	0.174	0.993	Main Effects	8	2.490	0.032
* Crèche differences	2	0.168	0.846	Crèche differences	2	2.234	0.123
Sex differences	1	0.248	0.623	Sex differences	1	0.765	0.388
Age differences	2	0.164	0.849	Age differences	2	4.822	0.015
Language differences	2	0.169	0.845	Language differences	2	1.800	0.182
Televiewing differences	1	0.044	0.836	Televiewing differences	1	0.126	0.725
2-Way Interactions	20	0.521	0.934	2-Way Interactions	18	1.175	0.336
Crèche by Sex	2	0.372	0.693	Crèche by Sex	2	1.721	0.195
Crèche by Age	3	0.162	0.921	Crèche by Age	3	0.263	0.852
Crèche by Language	3	1.346	0.279	Crèche by Language	2	0.271	0.764
Crèche by Televiewing	2	1.287	0.292	Crèche by Televiewing	2	1.156	0.328
Sex by Age	2	0.045	0.956	Sex by Age	2	2.689	0.083
Sex by Language	2	0.928	0.407	Sex by Language	1	0.138	0.713
Sex by Televiewing	1	1.169	0.289	Sex by Televiewing	1	4.432	0.043
Age by Language	2	0.626	0.542	Age by Language	2	1.464	0.246
Age by Televiewing	2	0 095	0.910	Age by Televiewing	2	0.254	0.777
Language by Televiewing	1	0.005	0.946	Language by Televiewing	1	0.030	0.864
3-Way Interactions	11	0.535	0.863	3-Way Interactions	10	1.561	0.164
Crèche by Sex by Age	3	1.049	0.386	Crèche by Sex by Age	3	2.838	0.054
Crèche by Sex by Language	1	2.413	0.131	Crèche by Sex by Language	1	0.180	0.674
Crèche by Sex by Televiewing	2	0.128	0.880	Crèche by Sex by Televiewing	1	1.259	0.270
Crèche by Age by Language	2	0.321	0.728	Crèche by Age by Language	1	1.027	0.318
Crèche by Age by Televiewing	1	0.549	0.465	Crèche by Age by Televiewing	2	0.247	0.783
Sex by Age by Language	1	0.015	0.904	Sex by Age by Language	1	0.005	0.942
Sex by Age by Televiewing	1	0.033	0.856	Sex by Age by Televiewing	1	0.937	0.340

APPENDIX B4.8 ANALYSIS OF COVARIANCE OF POSTTEST SCORES WITH PRETEST SCORES AS COVARIATES

	Control Group			Experimental Group			
	df	F	SIGNIF OF F		df	F	SIGNIF OF F
CLASSIFYING				CLASSIFYING			
Main Effects	8	0.825	0.587	Main Effects	8	0.695	0.693
* Crèche differences	2	1.193	0.318	Crèche differences	2	0.420	0.660
Sex differences	1	0.030	0.863	Sex differences	1	0.294	0.592
Age differences	2	1.466	0.247	Age differences	2	1.053	0.361
Language differences	2	0.459	0.636	Language differences	2	0.686	0.511
Televiewing differences	1	0.136	0.715	Televiewing differences	1	0.318	0.577
2-Way Interactions	20	1.069	0.426	2-Way Interactions	18	0.775	0.712
Crèche by Sex	2	1.321	0.282	Crèche by Sex	2	0.494	0.616
Crèche by Age	3	0.556	0.648	Crèche by Age	3	0.262	0.852
Crèche by Language	3	2.101	0.122	Creche by Language	2	0.237	0.791
Crèche by Televiewing	2	0.376	0.690	Creche by Televiewing	2	0.676	0.516
Sex by Age	2	0.339	0.715	Sex by Age	2	1.043	0.364
Sex by Language	2	0.036	0.965	Sex by Language	1	0.156	0.695
Sex by Televiewing	1	0.078	0.782	Sex by Televiewing	1	3.899	0.057
Age by Language	2	1.379	0.268	Age by Language	2	0.291	0.750
Age by Televiewing	2	1.759	0.190	Age by Televiewing	2	1.209	0.312
Language by Televiewing	1	1.050	0.314	Language by Televiewing	1	1.117	0.298
3-Way Interactions	11	0.730	0.701	3-Way Interactions	10	1.180	0.340
Crèche by Sex by Age	3	0.711	0.554	Creche by Sex by Age	3	2.198	0.107
Crèche by Sex by Language	1	0.028	0.867	Creche by Sex by Language	1	4.047	0.053
Crèche by Sex by Televiewing	2	2.231	0.126	Creche by Sex by Televiewing	1	4.175	0.049
Crèche by Age by Language	2	0.280	0.758	Creche by Age by Language	1	0.079	0.781
Crèche by Age by Televiewing	1	0.138	0.713	Creche by Age by Televiewing	2	3.903	0.030
Sex by Age by Language	1	0.420	0.522	Sex by Age by Language	1	0.036	0.850
Sex by Age by Televiewing	1	2.766	0.107	Sex by Age by Televiewing	1	5.154	0.030

* crèche differences refers to differences between the three child care centres, Jubilee, Dorkas and Holy Rosary Nursery schoo'

- Underlined F scores are significant at the 0,5 level of significance.

APPENDIX B4.9 ANALYSIS OF COVARIANCE OF POSTTEST SCORES WITH PRETEST SCORES AS COVARIATES

	Control Group			Experimental Group		
	df	F	SIGNIF OF F	df	F	SIGNIF OF F
SORTING						
Main Effects	8	1.714	0.137	8	1.575	0.172
* Crèche differences	2	1.279	0.294	2	0.680	0.514
Sex differences	1	0.040	0.843	1	0.632	0.432
Age differences	2	1.264	0.298	2	2.098	0.139
Language differences	2	2.386	0.110	2	1.460	0.247
Televiewing differences	1	0.085	0.773	1	1.144	0.293
2-Way Interactions	20	0.672	0.821	18	0.886	0.597
Crèche by Sex	2	0.235	0.792	2	1.404	0.260
Crèche by Age	3	0.207	0.891	3	0.276	0.842
Crèche by Language	3	0.292	0.831	2	0.346	0.710
Crèche by Televiewing	2	0.726	0.492	2	0.206	0.815
Sex by Age	2	0.256	0.776	2	2.205	0.127
Sex by Language	2	0.274	0.762	1	0.649	0.426
Sex by Televiewing	1	0.412	0.526	1	1.249	0.272
Age by Language	2	1.189	0.319	2	1.005	0.377
Age by Televiewing	2	1.871	0.172	2	0.093	0.911
Language by Televiewing	1	0.001	0.979	1	0.773	0.386
3-Way Interactions	11	0.417	0.936	10	1.549	0.168
Crèche by Sex by Age	3	0.505	0.682	3	0.374	0.772
Crèche by Sex by Language	1	0.669	0.420	1	0.431	0.516
Crèche by Sex by Televiewing	2	0.012	0.988	1	2.450	0.127
Crèche by Age by Language	2	0.124	0.884	1	0.177	0.677
Crèche by Age by Televiewing	1	0.174	0.680	2	0.365	0.697
Sex by Age by Language	1	1.228	0.277	1	0.467	0.499
Sex by Age by Televiewing	1	0.394	0.535	1	0.314	0.579

APPENDIX B4.10 ANALYSIS OF COVARIANCE OF POSTTEST SCORES WITH PRETEST SCORES AS COVARIATES

	Control Group			Experimental Group		
	df	F	SIGNIF OF F	df	F	SIGNIF OF F
PARTS OF WHOLE						
Main Effects	8	1.789	0.120	8	1.817	0.110
*Crèche differences	2	1.299	0.288	2	0.452	0.640
Sex differences	1	0.002	0.964	1	0.683	0.415
Age differences	2	3.039	0.063	2	1.229	0.306
Language differences	2	0.636	0.537	2	4.209	0.024
Televiewing differences	1	1.475	0.234	1	0.002	0.964
2-Way Interactions	20	0.599	0.881	18	0.627	0.852
Crèche by Sex	2	0.197	0.822	2	0.150	0.862
Crèche by Age	3	0.322	0.810	3	1.034	0.391
Crèche by Language	3	0.021	0.996	2	1.410	0.259
Crèche by Televiewing	2	1.213	0.312	2	0.928	0.406
Sex by Age	2	0.693	0.508	2	0.056	0.946
Sex by Language	2	0.213	0.809	1	0.877	0.356
Sex by Televiewing	1	0.413	0.525	1	0.130	0.721
Age by Language	2	0.192	0.827	2	0.016	0.984
Age by Televiewing	2	0.260	0.773	2	0.067	0.936
Language by Televiewing	1	0.054	0.818	1	2.093	0.158
3-Way Interactions	11	0.678	0.747	10	0.737	0.684
Crèche by Sex by Age	3	0.959	0.425	3	0.328	0.805
Crèche by Sex by Language	1	0.211	0.650	1	0.027	0.871
Crèche by Sex by Televiewing	2	0.452	0.641	1	0.072	0.790
Crèche by Age by Language	2	0.641	0.534	1	0.658	0.423
Crèche by Age by Televiewing	1	0.266	0.610	2	1.281	0.292
Sex by Age by Language	1	1.981	0.170	1	0.040	0.843
Sex by Age by Televiewing	1	0.257	0.616	1	0.044	0.836

* crèche differences refers to differences between the three child care centres, Jubilee, Dorkas and Holy Rosary Nursery school.
- Underlined F scores are significant at the 0,5 level of significance.

APPENDIX B4.11 ANALYSIS OF COVARIANCE OF POSTTEST SCORES WITH PRETEST SCORES AS COVARIATES

	Control Group			Experimental Group		
	df	F	SIGNIF OF F	df	F	SIGNIF OF F
EMOTIONS				EMOTIONS		
Main Effects	8	1.233	0.316	Main Effects	8	0.508	0.841
* Crèche differences	2	2.166	0.133	Crèche differences	2	1.097	0.346
Sex differences	1	0.474	0.496	Sex differences	1	0.079	0.780
Age differences	2	1.976	0.157	Age differences	2	0.390	0.680
Language differences	2	0.121	0.887	Language differences	2	0.337	0.717
Televiewing differences	1	0.002	0.965	Televiewing differences	1	0.888	0.353
2-Way Interactions	20	1.015	0.476	2-Way Interactions	18	2.117	0.031
Crèche by Sex	2	2.723	0.082	Crèche by Sex	2	0.440	0.648
Crèche by Age	3	1.424	0.256	Crèche by Age	3	0.848	0.478
Crèche by Language	3	0.916	0.445	Crèche by Language	2	1.734	0.193
Crèche by Televiewing	2	1.003	0.379	Crèche by Televiewing	2	1.918	0.159
Sex by Age	2	0.114	0.893	Sex by Age	2	1.474	0.244
Sex by Language	2	1.044	0.365	Sex by Language	1	0.210	0.650
Sex by Televiewing	1	0.191	0.665	Sex by Televiewing	1	1.114	0.299
Age by Language	2	0.073	0.930	Age by Language	2	0.063	0.939
Age by Televiewing	2	0.463	0.634	Age by Televiewing	2	2.641	0.087
Language by Televiewing	1	0.329	0.571	Language by Televiewing	1	4.953	0.033
3-Way Interactions	11	0.989	0.478	3-Way Interactions	10	1.958	0.073
Crèche by Sex by Age	3	1.039	0.390	Crèche by Sex by Age	3	0.986	0.412
Crèche by Sex by Language	1	0.235	0.632	Crèche by Sex by Language	1	0.599	0.445
Crèche by Sex by Televiewing	2	0.287	0.753	Crèche by Sex by Televiewing	1	0.870	0.358
Crèche by Age by Language	2	1.697	0.201	Crèche by Age by Language	1	0.421	0.521
Crèche by Age by Televiewing	1	0.112	0.741	Crèche by Age by Televiewing	2	3.344	0.048
Sex by Age by Language	1	0.159	0.693	Sex by Age by Language	1	3.131	0.086
Sex by Age by Televiewing	1	0.024	0.878	Sex by Age by Televiewing	1	2.489	0.125

APPENDIX B4.12 ANALYSIS OF COVARIANCE OF POSTTEST SCORES WITH PRETEST SCORES AS COVARIATES

	Control Group			Experimental Group		
	df	F	SIGNIF OF F	df	F	SIGNIF OF F
ATTITUDES (HAPPY)				ATTITUDES (HAPPY)		
Main Effects	8	2.661	0.025	Main Effects	8	0.245	0.979
* Crèche differences	2	4.957	0.014	Crèche differences	2	0.244	0.785
Sex differences	1	0.968	0.333	Sex differences	1	0.044	0.834
Age differences	2	0.693	0.508	Age differences	2	0.128	0.880
Language differences	2	0.637	0.536	Language differences	2	0.665	0.521
Televiewing differences	1	0.153	0.698	Televiewing differences	1	0.004	0.952
2-Way Interactions	20	1.053	0.440	2-Way Interactions	18	1.357	0.220
Crèche by Sex	2	3.243	0.054	Crèche by Sex	2	0.135	0.874
Crèche by Age	3	2.917	0.051	Crèche by Age	3	0.203	0.894
Crèche by Language	3	1.447	0.250	Crèche by Language	2	0.608	0.551
Crèche by Televiewing	2	1.699	0.201	Crèche by Televiewing	2	0.110	0.896
Sex by Age	2	0.838	0.443	Sex by Age	2	4.709	0.016
Sex by Language	2	0.024	0.976	Sex by Language	1	0.685	0.414
Sex by Televiewing	1	0.485	0.492	Sex by Televiewing	1	0.010	0.923
Age by Language	2	0.642	0.533	Age by Language	2	0.965	0.392
Age by Televiewing	2	2.619	0.090	Age by Televiewing	2	0.037	0.964
Language by Televiewing	1	2.216	0.147	Language by Televiewing	1	0.009	0.925
3-Way Interactions	11	2.312	0.036	3-Way Interactions	10	0.368	0.952
Crèche by Sex by Age	3	0.478	0.700	Crèche by Sex by Age	3	0.124	0.945
Crèche by Sex by Language	1	1.595	0.217	Crèche by Sex by Language	1	0.717	0.403
Crèche by Sex by Televiewing	2	3.037	0.033	Crèche by Sex by Televiewing	1	0.003	0.958
Crèche by Age by Language	2	8.041	0.002	Crèche by Age by Language	1	0.106	0.747
Crèche by Age by Televiewing	1	0.080	0.779	Crèche by Age by Televiewing	2	1.104	0.344
Sex by Age by Language	1	2.760	0.107	Sex by Age by Language	1	0.123	0.728
Sex by Age by Televiewing	1	0.189	0.667	Sex by Age by Televiewing	1	0.163	0.689

* crèche differences refers to differences between the three child care centres, Jubilee, Dorkas and Holy Rosary Nursery school.

- Underlined F scores are significant at the 0,5 level of significance.

APPENDIX B4.13 ANALYSIS OF COVARIANCE OF POSTTEST SCORES WITH PRETEST SCORES AS COVARIATES

	Control Group			Experimental Group		
	df	F	SIGNIF OF F	df	F	SIGNIF OF F
ATTITUDES (SAD)				ATTITUDES (SAD)		
Main Effects	8	3.021	0.014	Main Effects	8	0.249	0.977
* Crèche differences	2	8.030	0.002	Crèche differences	2	0.396	0.676
Sex differences	1	2.004	0.168	Sex differences	1	0.095	0.760
Age differences	2	2.589	0.092	Age differences	2	0.021	0.980
Language differences	2	1.215	0.311	Language differences	2	0.663	0.522
Televiewing differences	1	0.277	0.603	Televiewing differences	1	0.001	0.979
2-Way Interactions	20	1.539	0.141	2-Way Interactions	18	1.375	0.210
Crèche by Sex	2	4.140	0.026	Crèche by Sex	2	0.461	0.635
Crèche by Age	3	1.180	0.335	Crèche by Age	3	0.655	0.586
Crèche by Language	3	0.414	0.744	Crèche by Language	2	0.872	0.428
Crèche by Televiewing	2	1.226	0.308	Crèche by Televiewing	2	0.183	0.834
Sex by Age	2	1.896	0.168	Sex by Age	2	3.988	0.028
Sex by Language	2	1.586	0.222	Sex by Language	1	0.421	0.521
Sex by Televiewing	1	0.592	0.448	Sex by Televiewing	1	0.002	0.969
Age by Language	2	1.639	0.212	Age by Language	2	1.771	0.186
Age by Televiewing	2	0.539	0.589	Age by Televinwing	2	0.032	0.968
Language by Televiewing	1	0.444	0.511	Language by Televiewing	1	0.001	0.981
3-Way Interactions	11	1.482	0.192	3-Way Interactions	10	0.450	0.909
Crèche by Sex by Age	3	0.549	0.653	Crèche by Sex by Age	3	0.006	0.999
Crèche by Sex by Language	1	0.269	0.608	Crèche by Sex by Language	1	0.707	0.407
Crèche by Sex by Televiewing	2	1.288	0.291	Crèche by Sex by Televiewing	1	0.011	0.918
Crèche by Age by Language	2	5.041	0.013	Crèche by Age by Language	1	0.062	0.805
Crèche by Age by Televiewing	1	0.230	0.635	Crèche by Age by Televiewing	2	1.183	0.319
Sex by Age by Language	1	0.923	0.345	Sex by Age by Language	1	0.089	0.768
Sex by Age by Televiewing	1	0.035	0.852	Sex by Age by Televiewing	1	0.170	0.683

APPENDIX B4.14 ANALYSIS OF COVARIANCE OF POSTTEST SCORES WITH PRETEST SCORES AS COVARIATES

	Control Group			Experimental Group		
	df	F	SIGNIF OF F		F	SIGNIF OF F
TOTAL				TOTAL		
Main Effects	8	0.767	0.634	Main Effects	8	0.925	0.510
* Crèche differences	2	0.424	0.650	Crèche differences	2	0.483	0.621
Sex differences	1	0.031	0.862	Sex differences	1	0.133	0.718
Age differences	2	0.261	0.772	Age differences	2	1.678	0.203
Language differences	2	1.403	0.262	Language differences	2	0.733	0.489
Televiewing differences	1	1.938	0.174	Televiewing differences	1	0.243	0.625
2-Way Interactions	20	0.720	0.775	2-Way Interactions	18	1.401	0.197
Crèche by Sex	2	0.166	0.848	Crèche by Sex	2	1.041	0.365
Crèche by Age	3	0.201	0.895	Crèche by Age	3	2.280	0.098
Crèche by Language	3	0.883	0.461	Crèche by Language	2	3.366	0.047
Crèche by Televiewing	2	0.277	0.760	Crèche by Televiewing	2	0.379	0.689
Sex by Age	2	0.340	0.715	Sex by Age	2	0.927	0.406
Sex by Language	2	1.228	0.308	Sex by Language	1	4.034	0.053
Sex by Televiewing	1	0.012	0.915	Sex by Televiewing	1	0.017	0.373
Age by Language	2	1.652	0.209	Age by Language	2	1.024	0.178
Age by Televiewing	2	1.245	0.303	Age by Televiewing	2	0.083	0.921
Language by Televiewing	1	1.433	0.241	Language by Televiewing	1	0.019	0.890
3-Way Interactions	11	0.844	0.600	3-Way Interactions	10	0.696	0.721
Crèche by Sex by Age	3	0.608	0.615	Crèche by Sex by Age	3	0.756	0.527
Crèche by Sex by Language	1	0.772	0.387	Crèche by Sex by Language	1	0.014	0.906
Crèche by Sex by Televiewing	2	1.009	0.377	Crèche by Sex by Televiewing	1	0.489	0.490
Crèche by Age by Language	2	1.312	0.285	Crèche by Age by Language	1	0.295	0.591
Crèche by Age by Televiewing	1	1.313	0.500	Crèche by Age by Televiewing	2	0.863	0.432
Sex by Age by Language	1	1.514	0.220	Sex by Age by Language	1	0.200	0.658
Sex by Age by Televiewing	1	0.118	0.733	Sex by Age by Televiewing	1	0.554	0.462

* crèche differences refers to differences between the three child care centres, Jubilee, Dorkas and Holy Rosary Nursery school.

Underlined F scores are significant at the 0,5 level of significance

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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