



National Library
of Canada

Bibliothèque nationale
du Canada

Canadian Theses Service

Service des thèses canadiennes

Ottawa, Canada
K1A 0N4

NOTICE

The quality of this microform is heavily dependent upon the quality of the original thesis submitted for microfilming. Every effort has been made to ensure the highest quality of reproduction possible.

If pages are missing, contact the university which granted the degree.

Some pages may have indistinct print especially if the original pages were typed with a poor typewriter ribbon or if the university sent us an inferior photocopy.

Previously copyrighted materials (journal articles, published tests, etc.) are not filmed.

Reproduction in full or in part of this microform is governed by the Canadian Copyright Act, R.S.C. 1970, c. C-30.

AVIS

La qualité de cette microforme dépend grandement de la qualité de la thèse soumise au microfilmage. Nous avons tout fait pour assurer une qualité supérieure de reproduction.

S'il manque des pages, veuillez communiquer avec l'université qui a conféré le grade.

La qualité d'impression de certaines pages peut laisser à désirer, surtout si les pages originales ont été dactylographiées à l'aide d'un ruban usé ou si l'université nous a fait parvenir une photocopie de qualité inférieure.

Les documents qui font déjà l'objet d'un droit d'auteur (articles de revue, tests publiés, etc.) ne sont pas microfilmés.

La reproduction, même partielle, de cette microforme est soumise à la Loi canadienne sur le droit d'auteur, SRC 1970, c. C-30.

✓ Some Factors Affecting the Visual Appeal
of Television Characters

Christopher J. Golding

A Thesis

in

The Department

of

Education

Presented in Partial Fulfillment of the Requirements
for the Degree of Master of Arts at
Concordia University
Montréal, Québec, Canada

June 1987

© Christopher J. Golding, 1987.

Permission has been granted to the National Library of Canada to microfilm this thesis and to lend or sell copies of the film.

The author (copyright owner) has reserved other publication rights, and neither the thesis nor extensive extracts from it may be printed or otherwise reproduced without his/her written permission.

L'autorisation a été accordée à la Bibliothèque nationale du Canada de microfilmer cette thèse et de prêter ou de vendre des exemplaires du film.

L'auteur (titulaire du droit d'auteur) se réserve les autres droits de publication; ni la thèse ni de longs extraits de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation écrite.

ISBN 0-315-44807-5

ABSTRACT

Some Factors Affecting the Visual Appeal of Television Characters

Christopher J. Golding

This study addresses the field of television research, it is an investigation of performer and audience attributes, as well as production and presentation variables. The experimental study used a multi-factorial design. It tested the idea that a viewer's reactions to the TV image are the result of an interaction of variables found in the medium and those personal attributes unique to the individual viewer. Factors of production technique, sex and age of character, in combination with age and sex of viewer were studied. Additionally, repetition of segments and audio-visual versus visual-only formats were assessed. Subjects between the ages of four and six from the Montreal area, were tested on their attraction to certain character types currently being broadcast on the CBC, using the Program Evaluation Analysis Computer (PEAC). Silent segments and Sex of Character showed no effect on character appeal. Repetition elicited a decrease in character appeal on the part of older viewers. Animation enhanced character appeal, overall female viewers rated characters more positively than did males. Findings illustrated the practical use of the PEAC System for formative and summative research on audiences as young as four. Finally the thesis supported the practical nature of such research and outlined its benefits for the ETV industry.

Dedicated to my grandfather,

Frederick Golding

He gave testimony to the fact that
learning is a natural experience,
free for the taking, with no need
for certification.

I wish to thank Jon Baggaley for
his patience and enthusiasm when they
were sorely needed.

A special thanks to my wife Susan Rankin.
Her support and encouragement helped me
find time to start and complete my Masters.

Table Of Contents

1.PROBLEM STATEMENT	1
2.LITERATURE REVIEW	3
Practical Production Questions.....	3
TV and Children	6
Television Variables	7
Character Appeal Research	9
Attribution Theory	11
3.OBJECTIVES	13
Hypotheses	22
4.METHOD	25
Sample	25
Experimental Design	26
Materials	29
Procedure	31
Data Analysis	34
5.RESULTS	42
Stage I	42
Stage II	45
Stage III	56

6.DISCUSSION	.....60
Limitations	.....60
Sound Track	.....61
Age of Viewer	.....62
Repetition	.....67
Character Assessment	.....68
7.CONCLUSIONS	.....70
Animation	.....72
Repetition	.....74
8.REFERENCES	.....77
9.APPENDIX A	.....84

List of Figures and Tables

FIGURES

Page

1. Area concentrated production and performance
variable research categories. 8
2. Between-factors of Presentation Format, Audience
Age and Audience Sex.27
3. Within-factors of Production Technique, Character
Age, Character Sex and Repetitions.....28
4. First step in hand calculation in data reduction
for Stage II of experiment.36
5. Data matrix produced as a result of the data
reduction procedures.37
6. Stage II experimental design. 2 X 3 X 2 X (8 X 3)
multi-factorial.40
7. Results of PEAC analysis.43
8. Graph of Presentation Format and
Segments interaction.47

FIGURES

Page

9. Graph of Presentation Format (Audio-Visual
& Visual Only) Vs Production Technique
(Animated & Non-animated).49
10. Graph of Presentation Format (Audio-Visual
& Visual Only) Vs Character Type (Animated
Adult & Non-animated Adult).50
11. Graph of Presentation Format (Audio-Visual
& Visual Only) Vs Character Age
(Child & Adult).51
12. Graph of Audience Age and Repetition
interaction.53
13. Graph of Sex of Viewer main effect.....55

TABLES

Page

1. Major-Effect of Stage II 5-way Anova.....46
2. Results of One-way Anova for
each Character type.58
3. Summary of One-way Anova Results.59

Some Factors Affecting the Visual Appeal of Television Characters

Problem Statement

The following study addresses the manner in which preschool children react to various attributes that are inherent in any televised image. It assumes that audiences are not simply affected by the content of a message but indeed by the characteristics of the media and the characteristics of the performers who convey the message (Coldevin, 1975-83; Baggaley, 1976-86). As well, individual viewers also determine how the message will be received, based on personality attributes unique unto themselves. Therefore this work attempts to identify the interactive effects of a selection of attributes present in any exchange of information between a TV screen and its audience.

The study measures this exchange in a dynamic manner, one which allows a moment-to-moment sampling of the audience's reaction. Through the use of the Program Evaluation Analysis Computer (PEAC), a sensitive measurement of appeal across time was recorded. The investigation incorporates a number of independent factors and previous findings into one study. It evaluates the variables in a manner more representative of real life and in so doing produces results more meaningful to practitioners in the field.

An experiment is conducted containing three distinct types of variables: production, performer and audience, all of which can be

found in typical TV viewing situations. The study illustrates that the perception of a televised message is a result of the interactive nature of these variables. Certain variable combinations, used to label performer types, prove to be more or less appealing to various audience types who are in turn characterized by their own distinct attributes.

The study adds to an evolving practical theory of the TV image. If indeed the nature of the media can be identified and each form in that image can be associated with particular effects on the viewer, then educational strategies can be developed independent of the content being transmitted. The findings can be made available to the TV producer and in so doing, help foster a fruitful exchange of information between the areas of TV research and TV production: hitherto an underdeveloped relationship.

Literature Review

Practical Production Questions

In 1926 television emerged as a scientific tool, somewhat more a novelty than a practical invention. Television research has evolved since then from scientific empirical studies to the general social impact studies of the 1950's and 60's. Current trends in broadcast ETV have raised a number of new questions for, and approaches to research. In particular the concept of formative evaluation created a heightened awareness in producers. It pointed out the complex dynamics involved in the messages they were constructing and broadcasting. The production team's need for concrete, usable research findings has grown considerably since the early 1920's when most studies into the nature of audio-visual messages were conducted by the military (Cambre, 1981). Film was the predominate form of visual communication until the emergence of television. Research findings remained obscure until 1953 when the first edition of Audio-Visual Communication Review was printed. A small number of technical reports were made public at that time through this journal. Hoban (1956) illustrated the need for a bridge between basic and applied research. It was he who suggested a joint effort in the evaluation and production of audio-visual materials for the greatest success. Though the groundwork for profitable pre-production assessment had been laid, very little was actually being done. Ruffing (1967) noted this fact and pointed out that those producing educational television products did not have specialists in research, evaluation and educational psychology on their staffs.

In the late sixties, production companies undertook responsibility for identifying relevant production questions and began conducting their own formative evaluations.

Cambre (1981) points out that the Agency for Instructional Television (AIT) established a policy called "decision oriented research" for all its programming. Based on the need for answers to production questions, evaluations were carried out on such aspects as appeal, attention, comprehension and recall.

The Children's Television Workshop (CTW) uses formative evaluation techniques in order to address questions raised about their products. Of interest, is the development of a new evaluation instrument. The CTW and the Ontario Educational Communications Authority (OECA), introduced the Program Evaluation Analysis Computer (PEAC) system, (Nickerson, 1979) a system being used in this study.

Through the growth of viable formative research--that being reliable and quick research--many factors inherent in the exchange of information between children and the TV screen have been studied.

Primary to any instructional message is its ability to draw attention. The CTW supports the theory that attention and comprehension are closely linked. Lesser (1977) however reserved complete acceptance of this association, stating that CTW's research was not conducted with

the rigor or "theoretical underpinning" that would give structure and consistency to their results. Perhaps this illustrates the differences inherent in formative research and formative evaluation. Lesser is interested in the development of strong theory, and CTW is looking for information upon which to base production decisions.

Research into Sesame Street has expanded since its first year but continues to deal with those aspects of television which enhance attention. Lorch and Anderson (1983) in a study commissioned by the CTW, found a number of factors that affect visual attention. Factors such as auditory changes, sound effects, women's voices and odd voices, all increase attention according to their studies.

Producers are concerned with other facets of their programming beyond attracting attention. Primary among those concerns is "maintaining" attention once attracted, and determining whether formats, performers and content are appealing. Pacing, continuity, editing style and setting are all concerns of the TV producer. Keith Mielke (1983) summed up the state of modern television research in this passage.

Formative research is more attuned to generating hypotheses than to testing them, but its basis in the real world--that is, real television programs and real test audiences--provides an external validity that should not be ignored by those who test hypotheses and construct or modify theory. Conversely, the considerable insight into the target audience from the theoretical work in

developmental psychology, as well as strategic approaches from science educators and philosophers of science indicate the value of theory at the project level (p. 261).

IV. and Children

Hilda Himmelweit (1958), and Wilbur Schramm (1961), both undertook comprehensive studies of television and the effect it had on children. Schramm pointed out that TV was dominating children's leisure time and that it was fulfilling a child's need for a fantasy world.

In particular Schramm noted that specific audience types were closely associated with specific use patterns. Variables such as mental ability, social norms, social relationships, age and sex all played relevant roles in when and what children watched on television. He also supported in 1961 what is now blatantly obvious; that non-commercial television (i.e. ETV) was devoted to offering "reality experiences", and that such productions suffered for lack of talent and funding.

As television grew into the educational repertoire of many school boards and broadcast networks, research turned to the medium's effectiveness or lack thereof in this new field. Television was shown capable of simply teaching. If one group viewed a television series designed to teach a particular subject, then posttests showed that the television group knew more than the control group who received no instruction, a rather obvious result (Sykes, 1964).

Comparative studies became more prevalent shortly after. Traditional strategies and televised lessons were compared. Studies by Pleiger and Kelly (1961), and Kelly (1964) showed mixed results, but overall television as a sole provider of information showed no consistent advantages over traditional methods. What it could do was generate a regular audience. "Television has proved itself better at stimulating interest than stimulating intellectual or creative activity." (Schramm, 1961, pp. 173). However television in tandem with other strategies showed itself to be quite effective as an instructor.

Television Variables

In order to develop a more practical theory of the nature of the televised message, a new field of study arose. Technical advances, production methods and performer characteristics were analyzed. Studies of black and white versus colour formats, (Kanner and Rosenstein, 1960; Link, 1961) and screen size, (Alyward, 1960; Greenhill, Rich and Carpenter, 1962; Reede and Reede, 1963) all showed no significant differences in instructional settings. Research continued on such mega-characteristics, but more subtle forms found on the TV screen were assumed to have greater effects on the viewer.

Coldevin (1981) devised categories under which these forms could be identified (see Figure 1). Based on work by Shepherd (1967); Zetl (1968); Anderson (1972) and Schramm (1972), two distinct sets of variables were identified; production and performer variables.

<u>PRODUCTION VARIABLES</u>		<u>PERFORMER VARIABLES</u>
<u>Technical Variations</u>	<u>Content Organization</u>	
Camera Factors (Angle & Shot)	Opening-Closing Format	Dress
Setting	Simplicity & Complexity of Treatment	Body Type Age & Appearance
Lighting	Graphic Devices	Sex
Colour vs. B & W	Expository Delivery	Professional vs. Amateur
Audio Factors	Review Strategies	Eye Contact Levels
Visual & Audio-Visual Reinforcement	Cues & Advance Organizers	Missed Cues
Still vs. Motion Pictures	Pacing & Rhythm	Prestige & Prior Knowledge
Screen Composition	Order & Balance of Segments	Interaction with Relevant Production Variables
Special Effects	Activity Eliciting Potential	
	Humorous Inserts	

Figure 1. Area concentrated production and performance variable research categories. (From "Experimental Research in Television Message Design: Implications for ETV" by G.O. Coldevin, Programmed Learning & Educational Technology, 1981, 18, 2, p. 87).

Production variables involved those aspects of television directly controlled either through technical advances in equipment, (i.e. cameras, lighting, special effects) or through script writing or message design (i.e. pacing, humour, review strategies and program style and format). Performer variables were less tangible, but were considered as powerful in their ability to affect an audience.

Character Appeal Research

Little research has been done on the appeal generated by character types for preschool children. In most cases characters or performers have been studied in an effort to measure their ability to attract attention or their capacity to portray credibility and communicability.

"Measures of appeal have considerable utility in formative research...When coupled with follow-up interviews, appeal measures can be more readily diagnostic in nature than attention measures (i.e. the data can get at questions of why as well as what) (Mielke, 1983, p. 249).

In one instance the types of characters most favoured and best recalled by children were those which portrayed friendship and amusement (Jennings, 1980). In the study, kindergarten children were asked to recall their favourite TV characters. After questioning 85 subjects, a list of 29 performers had been drawn up, of which 90% were animated. Boys preferred characters with super-human powers, and girls preferred those who were cute and humorous.

In a study commissioned for an anti-smoking campaign, Baggaley (1985) asked 96 preschool children to rate eight characters on their appeal, by pushing one of two buttons on a PEAC response unit. One button was labelled with a happy face the other with a frown. Results indicated that the two most popular characters--a dog and a beaver--had four factors in common. Firstly they were both animals, secondly they were very colourful, thirdly they were both perceived as active and humorous and lastly each had a comical, distinguishing feature.

Many of these attributes, in particular the animal and comical features, have shown no great benefits as generators of attention, supporting the argument that attention and appeal factors may not operate synonymously.

Keith Mielke (1983), in a study of 3-2-1 Contact; a CTW production for eight to ten year olds, found significant differences in the appeal generated by performers based on their sex. Boys tended to prefer male cast members and girls tended to prefer female cast members. In The Muppet Show, a majority of boys preferred Kermit, a male puppet and the majority of girls preferred Miss Piggy, a female puppet.

In yet another study by Mielke (1983), older audiences did not find younger performers appealing.

Attribution Theory

Any one of these variables in isolation cannot lay claim to a direct effect on the viewer, but in combination they form an example of what Rummel (1970) describes as "factor complexity" and "variable complexity" (Baggaley, 1980). An effect may be attributable to one or a multitude of performer or production variables. Their relationships may be described as:

1. General effect, containing moderate or high loadings for many types of variables, and delineating a broad (high complex) pattern of data relationships,
2. Group effect, containing moderate or high loadings for a restricted number of variable types (fairly complex pattern); or
3. Specific effect, containing high loading of one type only, and delineating a very selective pattern of data relationships (cf. Rummel, p. 325-77).

This idea of complexity of factors found support within a field of social psychology. Attribution Theory (Heider, 1958; Kelley, 1967) and how it applied to the variable make up of the TV performer and the watching audience, introduced new questions to the researcher. Attribution Theory as redefined for television (Baggaley, 1980), can be stated as:

An attempt to render the factors underlying one's environment into a meaningful, structured form (p. 111).

Attribution Theory has become an important consideration in television research in the sense that the variability innate in each individual viewer causes him or her to perceive television forms differently.

Likewise the outward attributes displayed by the performers give rise to an intricate web of interactions among these attributes (Baggaley, 1980).

Present research attends to these more subtle relationships, and therefore this thesis addresses many factors, which in various combinations may be responsible for how television viewers derive and evaluate information from the television medium.

Objectives

Firstly this study intends to be practical.

As shown in the previous section, for the past forty years, researchers have studied television from various points of view and have aided in the development and understanding of the medium. Research into the effects of commercial TV were of greatest interest. For the most part commercial TV was not interested in academic research. Broadcast TV was controlled primarily by advertisers. Those programs that proved successful were frequently redesigned, repackaged and rebroadcast. This policy helped guarantee large audiences and potential customers and profits for the sponsors.

Children's television is broadcast not when it is most convenient for children, or when the largest children's audience would be attracted, but rather when children's television provides the greatest commercial advantage over alternative programming at that particular time (Melody, 1973, p. 15).

Educational television (ETV), on the other hand, does not operate under the same conditions. ETV producers are faced with a set of constraints unique to their task. Academic research is of primary importance in a situation where funds are lacking, objectives are precise and demanding and the audience is extremely fickle.

Though there is a need for practical research in ETV,

communication between the scholars and producers is still lacking.

Producers of television programming rarely read academic journals.

Cambre (1981), with respect to formative evaluation, stated that:

The results were made public, for the most part, in relatively
obscure technical reports. Consequently, the flow of theoretical
and technical information to those involved in the work of
producing educational materials in the field was alarmingly small.
(p. 15)

The term "formative evaluation", though first used by Michael
Scriven (1967) and used effectively under different names in among
other things, the production of military training programs, is just now
becoming well known. This method of concurrent production and
assessment holds great promise in the area of ETV. Coldevin (1981)
suggested that:

A great deal more sharing of ideas and results of studies should
take place between academics and professionals involved in
formative evaluation. (p. 103)

The thesis supports the need for formative evaluation in
instructional situations. Beyond that, the study is an example of
formative "research", an exercise that addresses concepts, theories and
techniques in an attempt to define general principals applying to all
exchanges between the TV screen and a human observer.

At present, most of the formative research in the field of

children's television is being conducted by the Children's Television workshop (CTW). CTW's materials are exemplary of current trends in broadcast children's television. Each of the segments studied in this thesis are the products of Sesame Street (CBC). Through constant evaluation and re-evaluation, successful programs such as Sesame Street will continue to improve if the research is conducted conjointly, or with intention to share the resulting knowledge.

One unusual facet of the experiment (i.e. Sesame Street) was the close working partnership between research and production (Palmer, 1972, p. 11).

Such cooperation offers the greatest chance for successful communication.

This type of evaluation, conducted on products that are already being broadcast, has been referred to as "Quasi-Formative Evaluation" (Baggaley, 1986). The summative evaluation of a finished product, provides formative information in the needs assessment portion of the next project. It is the structured path through a series of related studies that makes such research comparable to that done in the pure sciences.

This study attempts to suggest profitable strategies for the TV producer based on its findings. If certain character types have certain effects on certain audiences then this work has acted not only as an academic learning experience but also as a productive piece of

practical advice.

Thus this thesis is being conducted in cooperation with a producer of children's programming at the CBC.

Secondly this investigation is built upon previous work. Much of television research in the past has dealt with the effectiveness of the medium. Studies comparing television instruction with classroom techniques were numerous. Wilbur Schramm (1962) reviewed 393 "one-shot" experimental comparisons of this type and overall no significant differences were found. Other studies revolved around the issue of content and its social impact. Typical of such work is Bandura's (1963) and Feshbach's (1971) studies on television and aggression. Lately researchers have concentrated on the nature of the television medium itself and how its innate qualities can best be used. Coldevin (1980) stated that:

Fortunately the research pendulum is now returning to the important question of how to best use the medium in a given situation, (p. 64).

By identifying the component structure of instructional television, through presentation, performer and audience variables and their interactions with one another, a practical theory of the TV image can be defined.

This thesis grew directly from a recent paper (Baggaley, 1986), in which various character types were evaluated on their appeal for a

preschool audience. The paper was commissioned as a formative tool in the production of a television campaign. The campaign intends to address the hazards of smoking. This work--in part--builds upon questions raised during that formative evaluation. In particular the study suggested that viewers were less responsive to real-life children than they were to non-human (sometimes animated) characters. Such findings illustrate the need for more systematic studies. Studies of character attributes such as age and sex, separate from the effects of a particular scenario, can help identify standard production strategies that work regardless of message content.

Thirdly this experiment studies a group of subjects often ignored. The procedures call for an audience of four, five and six year olds. This group, because of the constraints of availability and capability, has been overlooked for more mature and more accessible subjects. Until recently preschool children remained at home. The proliferation of day-care centers has allowed access to these children in large groups, thus making them easier to test. The development of portable collection devices (i.e. the PEAC system - see Materials section), that are within the capabilities of even a four year old, have made the data collection a less arduous task. Data are thus; more plentiful, less subjective and therefore; more meaningful.

Coldevin (1981), after a review of the literature stated:

Most of the research...was conducted only with college students and accordingly the generalizability of findings to other student

groups may be spurious (p. 102).

Schramm (1972).also stated:

Young pupils...are very lightly represented among subjects of studies...whereas college students and military personnel are very heavily represented--indicating as always, that experimental research is done where populations are readily available (p.32).

However, not everyone agrees that the PEAC system is within the capabilities of a preschool audience. The Children's Television Workshop; who were partly responsible for the system's development, no longer regularly uses the device for preschool audiences. CTW feels that the use of sound, usually fast paced music, renders the children too active and excited for study using the PEAC system (J. F. Baggaley, personal communication, September, 1984). A pilot test for this study, and a study conducted at Concordia University (Baggaley, 1985), using children as young as three years old, showed that subjects four years old and older, were quite capable. The children were able to watch a short program (less than 10 mins.) and respond either negatively or positively to what they saw. The reported hyperactivity (Singer & Singer, 1983) associated with Sesame Street viewing, never surfaced. Of importance was the lack of sound in the studies conducted by Baggaley (1985), there was no indication of hyperactivity in the preschoolers watching these mute presentations. If the hyperactivity is a recurring behaviour, is it the result of the sound track alone? The thesis checks this possibility.

Fourthly this study addresses a combination of variables which until now have been studied only in isolation. The multivariate experimental design combines presentation, production, performer and audience variables and allows the identification of interactions among them. In particular this study illustrates how different audiences respond to different "forms" evident in a televised message.

Analysts have overlooked the audience member's basic capacities to disagree, to respond to different aspects of the stimulus in different ways, and to form the evershifting sub-groups that define a society's dynamism (Baggaley, 1980, p. 165).

Each of the factors in this design has been studied previously.

It has been shown that children especially prefer animated programming over real-life television productions.

Our preliminary findings confirmed what Walt Disney knew all along: cartoons are a sure-fire way to capture and sustain the attention of children (Palmer, 1972, p. 13).

As well, the appeal that an audience has for a performer has been shown to be sex related. Coldevin and Bernard (1981) found that males were perceived more favourably than females when viewed as professional news readers. They state:

"Educational television might well profit from a similar type of investigation" (p. 100).

The study determines whether the findings mentioned are reproduceable in this situation and therefore sex of character is measured over sex

of viewer.

Mielke and Chen (1980), in a study of the Children's Television Workshop production of 3-2-1 Contact, showed that children "favoured younger adult role models of the target age (8-12 yr. olds) or somewhat older". This design allows for the testing of this finding for a younger audience (4-6 yr. olds). In particular, how appealing are adults as compared to children, when used as performers in children's television?

Two presentation factors are included in this experiment. The first, is a comparison of audio-visual presentation versus visual only. Research has shown that the various channels of information, visual and auditory, work best in combination (Coldevin, 1975 a). Palmer (1972) states that children monitor television through its audio channel to determine whether the programming is directed towards children or adults. Elsewhere it states that a child's attention to TV is largely associated with the audio channel (Anderson and Levin, 1976; Wartella and Ettema, 1974). Thus half the subjects viewed the videotape with sound the others received a silent presentation. This permitted an evaluation of the characters themselves without the intervening variable of sound present. As well, it helped determine whether the visual channel could sustain character appeal on its own.

The second presentation factor is "repetition of segments". Each segment was seen three times in the course of one experimental session.

Previous findings show repetition to be beneficial in instructional settings (Cook, 1960; Lumsdaine, Sulzer, and Kopstein, 1961). In this investigation, repetition and its effects on appeal are appraised. As well, it is used as an indicator of test practice and fatigue during the experiment.

Lastly the instrumentation in this study allows a moment-by-moment sampling of the audience's reaction to the presentation and performer factors built into the design. Thus the flexibility of the technology permits a more dynamic assessment of the interactions involved not only on a grand scale but also allows a look at the effects of the meta-messages as well.

Preschoolers we have found, are highly selective. They do not retain an interest in a television show on a program-to-program basis but rather on a moment-to-moment basis (Palmer, 1972, p. 12).

Much of the research upon which this study is based deals directly with the concept of "viewer attention". For the most part this thesis assumes that attention and character appeal are related. Previous studies, because they used methods that did not or could not test immediate personal reactions such as character appeal, have attempted to measure attention to the TV screen. The PEAC system introduces a decided advantage in this respect, in that it measures from moment-to-moment a subject's feelings without the intervention of an observer.

In conclusion, this thesis is an attempt to study a complex interaction of factors. It addresses the problem in such a manner, simply because the nature of the TV image is, in itself, a potpourri of stimuli, and any theory that may eventually result from this field of research will be based on many interactive factors rather than one specific main effect.

"In seeking to study the influence of communication via TV we are faced with a complex problem par excellence: and we must be prepared to account for the separate mediating factors that interrelate within the process and for the interaction of external influences with them. The whole is a Gordian Knot whose untying requires a set of correspondingly intricate research tools (Baggaley, 1980, p. 164).

Hypotheses

The nature of the study allows for the statement of a number of hypotheses most of which would test the presence of interactive effects between any of the seven factors in the design. Because of this, the hypotheses stated below constitute only the predominant expectations of this experiment.

1. The appeal of segments free of voices and strange noises, either through lack of sound (Vis Only) or accompanied by low level music only (Audio-Vis), should show no significant differences for the appeal of each character. The non-verbal audio track acts primarily as an attention grabber (Huston-Stein & Wright, 1979; Palmer, 1972). It is

often voices or strange sounds that attract a viewer (Huston-Stein & Wright, 1979; Alwitt, Anderson, Lorch & Levin, 1980). It is likely that character appeal is generated after a viewer's attention has been captured.

2. No preference will be shown for characters of the same sex. Male viewers will not prefer male characters and female viewers will not prefer female characters. In studies of older children (10 & 11 yrs. old), subjects found characters of their own sex group more appealing (Mielke, 1983). This finding may also apply to preschool children.

3. It is expected that no significant differences will be found among the subjects ages four through six. It has been shown that preschoolers are more attentive to the salient, formal features of a program, while older children rely more on content (Huston-Stein & Wright, 1979). Older children (> 6yrs.), though they become more attuned to content, maintain their attraction to salient forms (Wright & Huston, 1983). The segments in this study have no, or little content and no plot structure.

4. Adult characters will not be significantly more or less appealing than child-like characters. In previous studies, "age of character" has had little influence on the communicability generated by a performer (Coldevin, 1977). It is expected that such will be the case with character appeal as well.

5. Animated characters will be no more appealing than non-animated characters. It has been repeatedly shown that children prefer animated performers more than real-life actors (Alwitt, Anderson, Lorch, & Levin, 1980; Anderson & Levin, 1976, Palmer, 1972). This finding will be tested in the study.

6. It is expected that viewers will show no preference for child-like characters over adults as they themselves get older. It seems, that as children increase in age they become more concerned with the appropriateness of the programs they view. Some programming may be deemed "babyish" and thus inappropriate. (Mielke, 1983).

7. It is expected that the appeal for a given character will not significantly vary over three repetitions. Broadcast instructional television uses repetition as a means of improving recall of an object or developing mastery of a task. Review strategies have shown their ability to increase recall (Coldevin, 1975 b). It is not known how repetition affects likeability of a performer.

Method

Sample

One hundred and fifty-one children between the ages of four and six participated as subjects in this study. Each of the children attended either a day-care centre or kindergarten class daily. All subjects were located on the island of Montreal. The socio-economic levels of the children were not considered as a control factor and therefore varied within the resulting groups. In most cases their first language was English. All were sufficiently capable in this language to handle the task adequately.

Twenty institutions were targeted as possible sources of subjects. Of the fourteen day care centres and six elementary schools, ten were willing to cooperate. Permission to test the children was requested from both the parents and the directors of the schools and day-care centres. Upon completion of the data collection phase exactly 151 children had participated.

Each of the separate institutions (intact groups) were assigned randomly to each of the presentation variables (audio-visual presentation and visual-only presentation). The randomness was assured by conducting each of the two treatments during alternate testing sessions. Each of the subject clusters were tested in an order determined by the constraints imposed by the various schedules of each school or day-care centre.

Experimental Design

This experiment was carried out in three stages (See Data Analysis). The first stage involved analysis using the PEAC System in isolation. Stages II and III were conducted using standard analysis of variance procedures to test the findings of the PEAC system and to add rigor to the experiment.

The between-factors were determined by the presentation format they viewed, their sex and their age (See Figure 2).

AUDIO- VISUAL	4 YRS	MALE
		FEMALE
	5 YRS	MALE
		FEMALE
	6 YRS	MALE
		FEMALE
VISUAL ONLY	4 YRS	MALE
		FEMALE
	5 YRS	MALE
		FEMALE
	6 YRS	MALE
		FEMALE

Figure 2. Between-factors of Presentation Format, Audience Age and Audience Sex.

The within-factors were composed of a combination of presentation variables and character attributes (See Figure 3). Three of the within-factors were confounded: Production technique, Character Age and Character Sex. It was decided that the results may have been contaminated due to these uncontrolled variables. In order to eliminate this threat, these cells were collapsed to form one factor called Segments. If differences were found in the segments in Stage II, then a separate analysis of variance would be performed on each of the characters to determine their differences in Stage III. As well it was the intention of the study to pool between-factors that showed no differences in Stage II and conduct further analysis on the larger cell sizes, during stage III.

ANIMATED												NON-ANIMATED											
CHILD						ADULT						CHILD						ADULT					
M			F			M			F			M			F			M			F		
1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3

Figure 3. Within-factors of Production Technique, Character Age, Character Sex and Repetitions.

Materials

A videotape was created for use in the study. It contained eight, 20 second segments, shown three times each, in a staggered order. All were products of the Canadian Broadcasting Corporation (CBC) and are currently being used in the Canadian segments of Sesame Street. The segments were screened for suitability and transferred from a 3/4 inch to 1/2 inch Beta format. To better simulate the real program a standard Sesame Street introduction and ending were added. Each of the eight segments represented a particular character type, identified by three within-factors. They are age of character, sex of character and production format (animated vs. real life actors).

So that the characters could be evaluated in isolation, the segments were edited such that each character was seen alone on the screen. No accompanying verbal track was used. Instead a musical, non-lyrical sound track was laid down on each segment. This allowed the subjects to be free of the effects of message content during their evaluation.

Sound, like any other sensory input, has many nuances. The sounds added to the audio-visual version of the experiment were all musical. They were general musical excerpts from other, unrelated Sesame Street segments. They had a definitive rhythm and melody. None had lyrics or narrative. None had a dominant positive or negative nature. Certainly music used in a horror movie or music used in a love story have qualities or attributes which send very strong messages to the viewer.

These messages are quite clear, either it's time to get scared, or it's time to pay attention, or it's time to cry with joy. None of the musical excerpts used in the study were that definitive. They were general in their purpose, typically child like, neither extremely negative nor positive.

The eight components were shown three times during the course of the videotape. The order was contrived such that no one segment preceded or succeeded any other more than once. The staggered order assured that the average position of each character in the total sequence was within 2.1 parts of the median position. This hybrid arrangement counteracted the effects of practice or fatigue on the subjects' responses.

The segments and their order was such:

1 Animated	Child Male	(ACM)
2 Non-Animated	Adult Female	(NAF)
3 Animated	Child Female	(ACF)
4 Non-Animated	Adult Male	(NAM)
5 Animated	Adult Male	(AAM)
6 Non-Animated	Child Female	(NCF)
7 Animated	Adult Female	(AAF)
8 Non-Animated	Child Male	(NCM)

INTRO - 1 2 3 4 5 6 7 8 -

- 2 4 6 8 1 3 5 7 -

- 3 6 1 4 7 2 5 8 - EXTRD

Baggaley's study (1986) is duplicated in this particular portion of the thesis. So that a strong comparison can be made between the two investigations, the videotape's format and the testing procedures are the same.

The videotape was viewed using the same equipment in each session. A Sony 1/2 inch playback unit and a 14 inch Sony Trinitron colour monitor was taken to each location.

The PEAC system itself consisted of an Apple II+ microcomputer equipped with 64 kilobytes of memory and a special modem card used to interface the microcomputer with the PEAC storage case. The case itself contained 24 hand units and when inside this case, the units could be programmed to accept subject inputs, dump collected data into the computer or have their batteries charged. Only the storage case and not the computer needed to be transported to the test sessions.

Procedure

In order to assess each segment's appeal the Program Evaluation Analysis Computer (PEAC) system was used. Through the use of small hand-held response units, the PEAC system allowed a moment-to-moment sampling of the subjects' appreciation for each character.

The units are programmable using a microcomputer, so that they sample the viewer's reactions in any one of a variety of ways. In this

case only two, of an array of buttons, were activated. One button was programmed for a positive response, another for a negative response. Additionally, those buttons which were rendered non-activated recorded "invalid" responses and when no buttons were being pressed the units were recording "null" responses.

These units also had digital read-out windows that indicated either the button presently being pushed or the last button pushed. It was also possible to have the displays non-functional.

The system could record up to 23 subjects in one session. Through the use of a twenty-fourth unit--a master unit--the remainder were synchronized in time with the program being evaluated. After the session, the data accumulated by each unit was transferred to the microcomputer for analysis and storage.

Prior to each session the hand units were programmed. Each was set to sample the respondents every two seconds and record either a positive or negative response. The digital read-out operated only when a button was being pressed and thus it encouraged the subjects to continually push one or the other button.

A cover was placed over the balance of the buttons to avoid any confusion or distraction. As well each of the response buttons; positive and negative, were labelled with a "happy face" and a "sad face" template, so that younger children could better identify their

significance.

The study was conducted on consecutive week-days. Each session was carried out in the morning. In one case two sessions were conducted on the same morning. The videotape was viewed in a group situation with the children sitting on the floor around the monitor. Group sizes varied. Efforts were made so that each testing session was conducted in a room free of outside distractions.

A standard set of instructions was delivered to each group. These instructions are given in detail in Appendix A.

Demographic information was recorded by the teacher while the children viewed the tape or shortly afterwards. The information was then matched with the corresponding numbers on each of the hand units used.

After each session the data were immediately stored on floppy diskettes via the microcomputer. Later the corresponding demographic information was manually entered for each subject. Schools were supplied with a summary of the preliminary results with an offer to supply further information upon completion of the study. The schools and the children maintained anonymity throughout the study.

Data Analysis

The data were compiled in an array containing 240 single response points for each of the subjects for a total of 36240 data points. Each response was either positive, negative or null and coincided with each successive two second interval throughout the program. The software performed a basic descriptive analysis of the data. Comparisons across time and demographic groups were easily graphed.

The PEAC software is presently incapable of rigorous inferential statistics. Calculating the differences between the number of positive responses (#PR) and the number of negative responses (#NR) by any one individual across a group of time points was also outside the system's capabilities. These statistics, necessary for the Anova procedures, were subsequently calculated by hand.

Thus the study uses two means to analyze its findings. The PEAC system can be supported in its findings only if the same results can be identified and substantiated through a time tested and accepted inferential statistical analysis.

The necessary statistic called the "response differential" R (dif) was calculated as the difference between positive and negative responses for each segment. Thus: $R_{dif} = \#PR - \#NR$. The following example, illustrated in Figures 4 and 5, will help explain: Each character studied was edited into a twenty second segment. There

were exactly 8 characters studied. Each segment was viewed three separate times. Thus the videotape was 480 seconds or eight minutes in length. A standard introduction and closing were added but not evaluated. The 151 subjects viewed the videotape and their responses were automatically polled by the PEAC system every two seconds. A typical sample of responses for a subject is given on the next page.

SUBJ#	REP.	CHAR.	TIME POINTS	POLLING
<hr/>				
117	1	NAM	53	S (child pressed smile button)
	1st.	non-anim.	54	S
	viewing	adult	55	(child pressed no button)
		male	56	
			57	S
			58	S
			59	S
			60	S
			61	S
			62	S
TOTALS: #PR = 8 #NR = 0			R(dif) = +8	
	2	NAM	113	S
			114	S
			115	S
			116	
			117	S
			118	S
			119	S
			120	S
			121	S
			122	S
TOTALS: #PR = 9 #NR = 0			R(dif) = +9	
	3	NAM	213	F (child pressed frown button)
			214	F
			215	F
			216	F
			217	
			218	S
			219	S
			220	S
			221	S
			222	S
TOTALS: #PR = 5 #NR = 4			R(dif) = +1	

Figure 4. First step in hand calculation for preparation of data for analysis of variance in Stage II of the experiment.

Character Appeal 37

The calculations shown on the previous page were performed for each of the 151 subjects and for each of the eight characters. Upon completion of the data reduction, each subject had one measure of appeal for each of the 24 segments ranging on an integer interval scale from -10 (all negative responses) to +10 (all positive responses).

SUBJ#	REF	SEG ->	1 2 3 4 5 6 7 8							
			NAM							
1	1		.	.	.	.	.	.	.	.
	2		.	.	.	.	.	.	.	.
	3		.	.	.	.	.	.	.	.
2	1		.	.	.	.	.	.	.	.
	2		.	.	.	.	.	.	.	.
	3		.	.	.	.	.	.	.	.
3	1		.	.	.	.	.	.	.	.
	2		.	.	.	.	.	.	.	.
	3		.	.	.	.	.	.	.	.
117	1		.	.	.	+8	.	.	.	.
	2		.	.	.	+9	.	.	.	.
	3		.	.	.	+1	.	.	.	.
151	1		.	.	.	.	.	.	.	.
	2		.	.	.	.	.	.	.	.
	3		.	.	.	.	.	.	.	.

Figure 5. Resulting data matrix with sample data calculated in Figure 4, produced by calculation of R(dif) statistic for all subjects and all characters. Total data points equal 3624.

Null responses were not considered in the calculations. Nulls were difficult to interpret with any certainty. They may have represented non-attentiveness, invalid responses, indecision, non-compliance or non-comprehension of task, whereas it can be stated that the pressing of the negative or positive buttons constituted a specific action and meaning.

The resulting data were analyzed using a multi-factorial analysis program for the Apple II+ computer. The program, called "GANOVA", was developed at UCLA and is capable of dealing with a variety of complex designs. The program performed an Anova on a mixed-factorial design with three between and four within-factors. All of the between-factors were nested and all factors, both between and within, were fixed. The cells however, were not of equal size. The program therefore was used to perform the necessary tests on the non-orthogonal design. The statistical package allowed for the testing of interactions, main effects and comparisons, all of which were used in the analysis of this experiment. As each discovery was noted, the next step in the analysis became more evident.

Thus GANOVA allowed the user literally to "think his way through an analysis" in a manner advocated by many leading analysis of variance textbook writers (cf. Keppel, 1982, p. 237 - 238).

(Brecht and Woodward, 1983)

It was noted that three of the within-factors were confounded.

Therefore the factors of Production Technique (Animated versus Non-animated), Character Age (Child versus Adult) and Character Sex were collapsed to form one factor called Segments. This gave rise to a three staged study.

Stage_I

The data were plotted descriptively using the PEAC software. This form of analysis graphically indicated the strengths and weaknesses of each of the eight characters over time. Both positive and negative responses were accumulated and plotted simultaneously on the graph, giving a moment-by-moment assessment of the characters in the program. Recurring positive or negative responses for a particular character over three viewings, substantiated recommendations to retain, enhance, or delete such characters.

Stage_II

The 5-factor design shown in Figure 6 represents Stage II. It essentially is the combination of Figures 2 and 3. It concentrates on the study of the three between-factors, primarily audience attributes.

			SEG1	SEG2	SEG3	SEG4	SEG5	SEG6	SEG7	SEG8
			123	123	123	123	123	123	123	123
AUDIO-VISUAL	4YRS	MALE								
		FEMALE								
	5YRS	MALE								
		FEMALE								
	6YRS	MALE								
		FEMALE								
VISUAL ONLY	4YRS	MALE								
		FEMALE								
	5YRS	MALE								
		FEMALE								
	6YRS	MALE								
		FEMALE								

Figure 6. Stage II experimental design. 2 X 3 X 2 X (8 X 3) multi-factorial. Result of combining Figures 2 and 3. Factor of Presentation format (Audio-visual -Visual Only) was ultimately pooled in Stage III.

Data were analyzed for interactions among all factors.

Subsequently those interactions were further studied to determine the influence of individual variables. Comparisons were conducted on factors specifically mentioned in the problem statement, rationale and hypotheses sections of this thesis.

Stage III

The results of the five-way analysis gave rise to the third stage. The between-factors found non-significant in Stage II were pooled, effectively making the third stage a two by two analysis. The pooling offered advantages. It increased the number of subjects in each cell and thus enhanced the power of the analysis, and helped avoid the threat of obtaining a Type II error. Type II error is:

an error caused by our failure to reject the null hypothesis when the alternative hypothesis is true. This type of error has been described as "not seeing enough in the data" (cf. Anderson, 1966, p. 72) (Keppel, 1980, p. 105).

The 4-way Anova conducted in Stage III was again evaluated for interactions and main effects; some specific comparisons were conducted.

The differences among the eight segments were then determined using a one-way analysis of variance for each repetition within various groups of subjects. The segments evincing significantly different degrees of appeal were inspected for common attributes. Alpha was set at .05 for all tests.

Results

Stage 1: The PEAC Analysis

The results presented in this section deal directly with the graph generated from the PEAC program. It represents positive and negative responses to each of the characters. Immediate assessment of this graph in the field would elicit some interesting and valuable conclusions, some of which are substantiated by the Analysis of Variance.

For the purposes of a television producer, the graph should distinguish between characters that are popular from those that are in some way distasteful.

A quick perusal of the graph in Figure 7, points out only three incidences where the lines intersect, indicating that the character is being perceived as being more negative than positive. In all three cases the same character is involved; the Non-Animated Adult Female (NAF). This segment would be considered highly suspect and would be reworked before further broadcast.

Another weak segment was the Non-animated Child Male (NCM). This segment had high numbers of negative responses in each viewing. Though in each case there were slightly more children pressing the positive buttons. The highly negative response provides a more important indication of the segment's worth. Children are more likely to provide positive responses than negative.

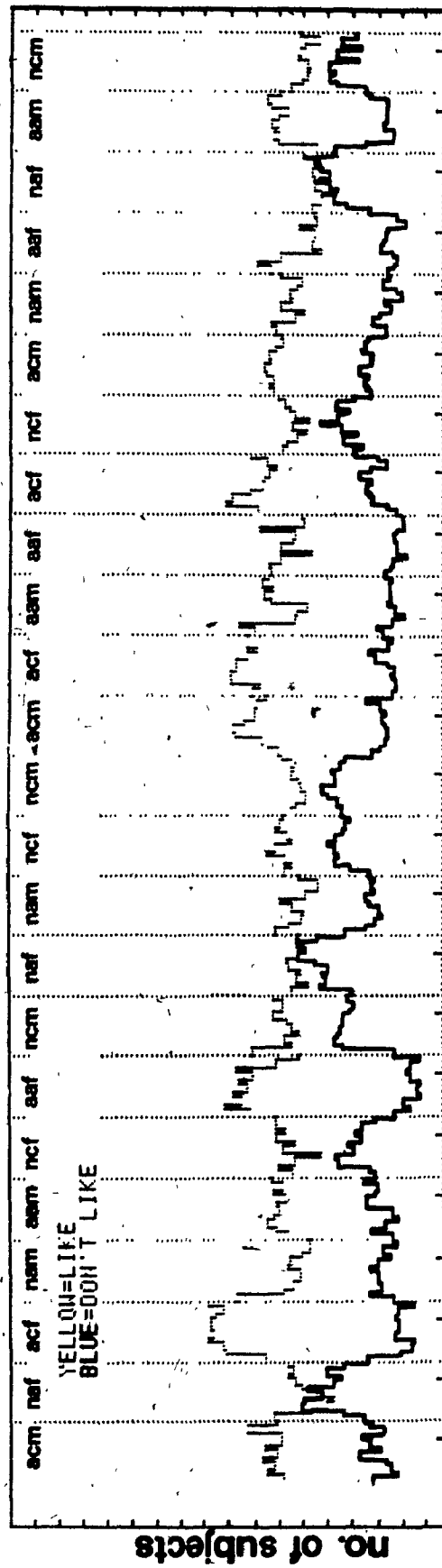


Figure 7. Results of the PEAC analysis.

The most consistently positive character appeared to be the Animated Child Female (ACF). It generated a 60% positive score each time it was viewed. It was the only segment that did not decrease in appeal over the three viewings. Of the non-animated variety, the most positive character was the Non-animated Adult Male (NAM). Of all real-life characters he received the most consistently positive rating.

A closer study of the graph would substantiate earlier statements regarding animation. Animated characters were more popular and appealing than were real-life characters. This is clearly evident if you study the middle portion of the graph. In this section, the real-life characters are shown back to back and are then followed by the four animated characters. The lines converge in the real-life character portion of the graph, whereas the animated segments show the lines spreading out. This visual depiction is easily interpreted. As the lines merge the negative responses increase and the positive responses decrease. The opposite is true when characters are rated positively. Nowhere else is there evidence of such a strong trend. Other attributes of Age of Character and Sex of Character do not show any consistent pattern.

Lastly, if you study the graph as a whole, you can easily determine the decrease of positive responses over time. Each of the repetitions is represented by a third of the graph. As time progresses, the positive responses diminish and the negative responses increase.

The benefits of such an analysis would be three fold for the producer. Any excessive expenditures created as a result of animated production would be justified by these findings. Secondly, two of the characters have been identified as weak and should therefore be reworked or deleted. Lastly two other characters, one of them non-animated, have been shown to elicit high positive responses from the children. Such information for a television producer is primary to any production decision he or she may wish to make during the formative stages of next year's programming.

The graph's short comings include a lack of analytical rigor. Certainly the statistics and their graphic representation are easily interpreted, but are they accurately interpreted each and every time? It is unlikely that the analyst could be totally free of bias in such a situation. Benefits such as quick data collection, the resulting large sample size, moment-by-moment analysis and ease of interpretation must be weighed against the natural bias that all producers would introduce into this type of assessment. Thus there exists a need to substantiate such findings with a more traditional form of analysis.

Stage II: 5-way Anova

The full results of the 5-way Anova are presented in Table 1.

Table 1. Major Effects of Stage II 5-way Anova.

SOURCE		SS	df	MS	F	p
1 Pres-Fmt	Ho	388.23	1	388.23	2.18	0.138
	Error	24739.53	139	177.98		
2 Aud-Age	Ho	1110.50	4	277.63	1.55	0.187
	Error	24739.53	139	177.98		
3 Aud-Sex	Ho	3520.24	6	586.71	3.30	4.890E-3 *
	Error	24739.53	139	177.98		
4 Segments	Ho	3308.28	7	472.61	11.88	3.344E-8 **
	Error	38679.52	973	39.75		
5 Repetitions	Ho	323.19	2	161.60	4.71	9.772E-3 *
	Error	9529.18	278	34.28		
1 X 4	Ho	859.98	7	122.85	3.09	3.491E-3 *
	Error	38679.51	973	39.75		
1 X 5	Ho	9.22	2	4.61	0.13	0.870
	Error	9529.18	278	34.28		
2 X 4	Ho	1104.22	28	39.44	0.99	0.478
	Error	38679.52	973	39.75		
2 X 5	Ho	539.49	8	67.44	1.96	0.050 *
	Error	9529.18	278	34.28		
3 X 4	Ho	1868.35	42	44.48	1.12	0.280
	Error	38679.52	973	39.75		
3 X 5	Ho	446.93	12	37.24	1.09	0.371
	Error	9529.18	278	34.28		
4 X 5	Ho	492.89	14	35.21	1.90	0.022 *
	Error	36039.29	1946	18.52		
1 X 4 X 5	Ho	795.67	14	56.83	3.06	2.141E-4 **
	Error	36039.29	1946	18.52		
2 X 4 X 5	Ho	1245.74	56	22.25	1.20	0.148
	Error	36039.29	1946	18.52		
3 X 4 X 5	Ho	1915.46	84	22.80	1.23	0.079
	Error	36039.29	1946	18.52		

* Significant at $p = .05$ ** Significant at $p = .001$

The 5-way Anova elicited three interactions.

Interaction 1

The first interaction, $F(7,973) = 3.09, p < .05$, between Presentation Formats and the Segment Factor is depicted in Figure 8.

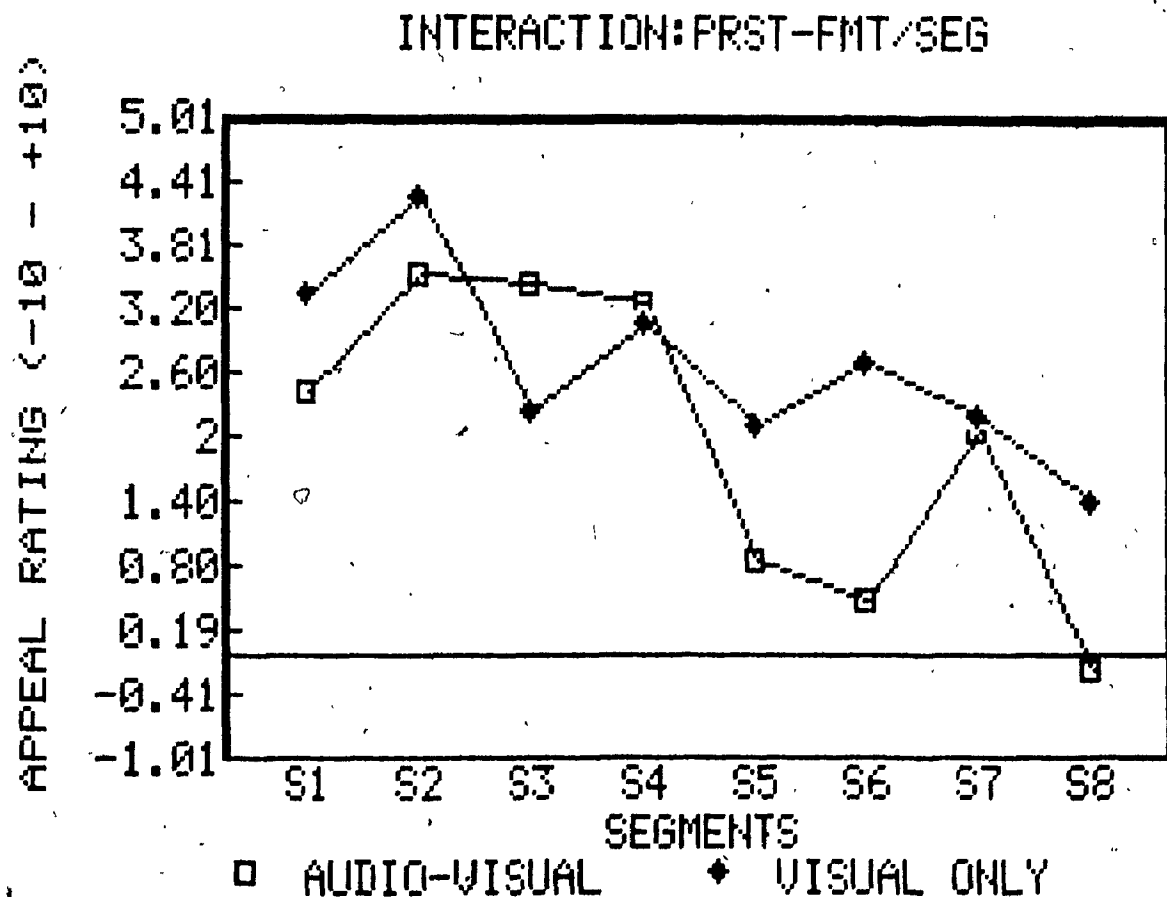


Figure 8. Ratings for all eight characters for both audio-visual and visual only presentations.

Comparison 1:

Comparisons of the individual character types showed that animated characters were perceived more favourably than real-life actors, $F(1,139) = 4.10$, $p < .05$, with a marked increase in appeal for real-life actors in the silent presentation. (See Figure 9.)

Comparison 2:

This same finding was supported in a comparison of animated adults versus real adults. (See Figure 10.) Again animated characters were rated as more appealing, $F(1,139) = 6.30$, $p < .05$, however the silent version only elicited an increase in appeal for the real-life character.

A further comparison, showed that this animated factor did not have a duplicate effect on animated children versus real children.

Comparison 3:

In the audio-visual presentation, adults were more appealing than children but in the silent version this effect was reversed, $F(1,139) = 8.46$, $p < .05$. Though both groups increased their appeal in the silent version the children experienced a greater increase as shown in Figure 11.

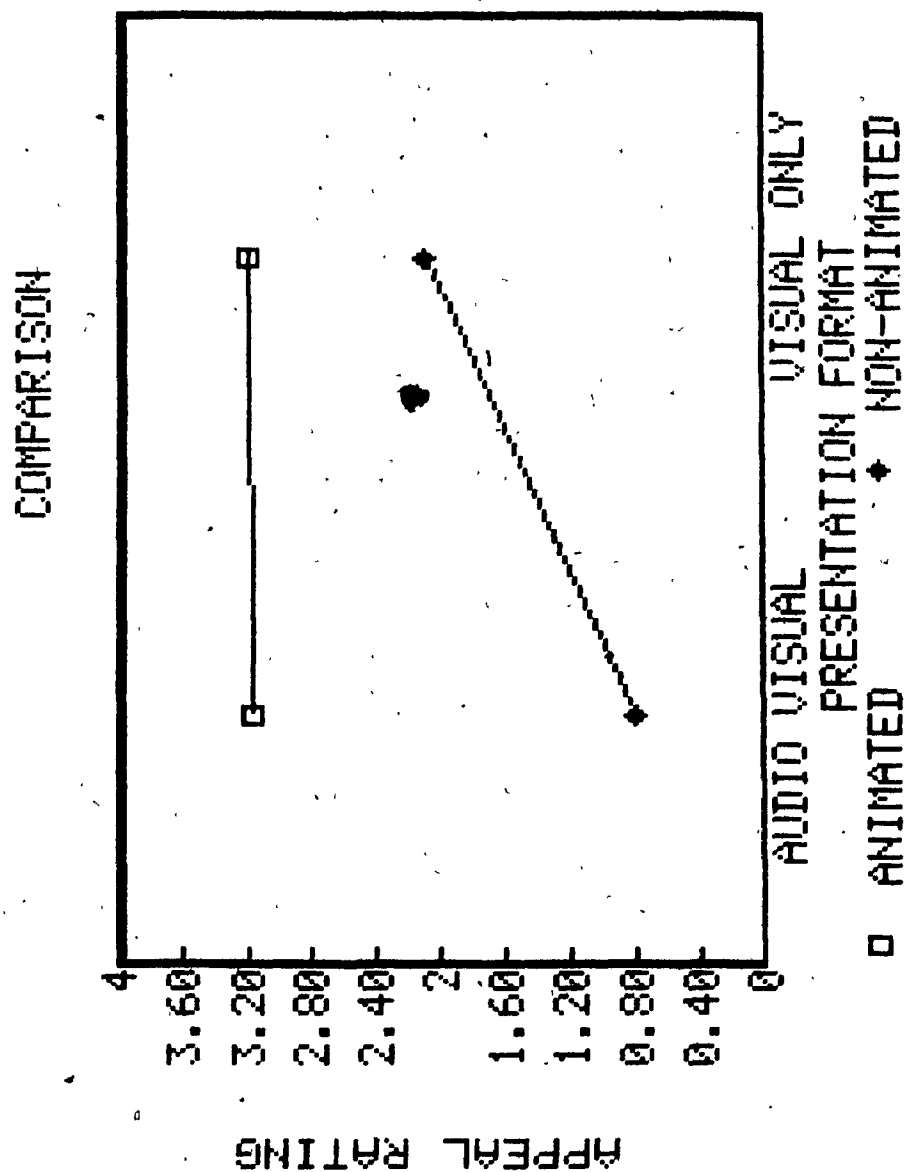


Figure 9. Ratings for animated characters versus real-life actors in both the audio-visual and visual only presentations.

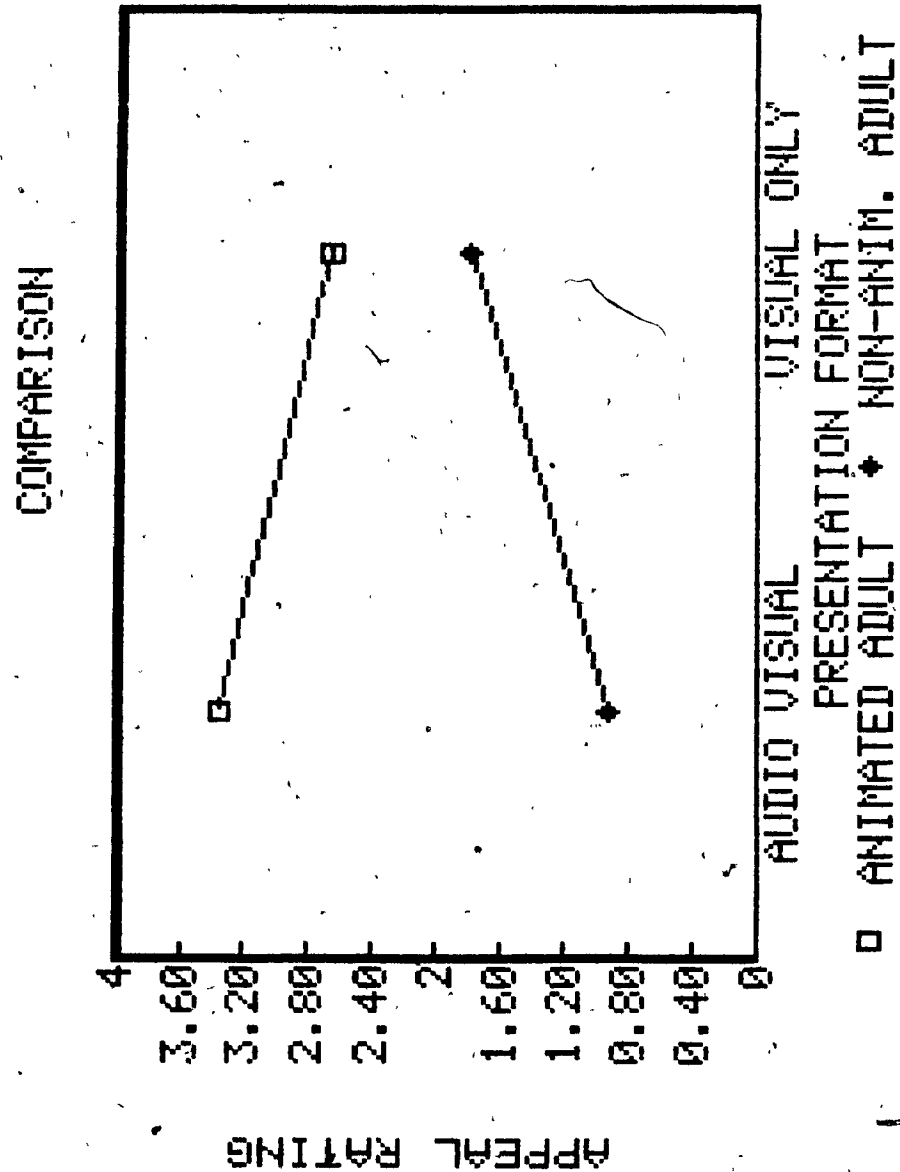


Figure 10. Ratings for both animated adult characters and real-life adults in both the audio-visual and visual presentations.

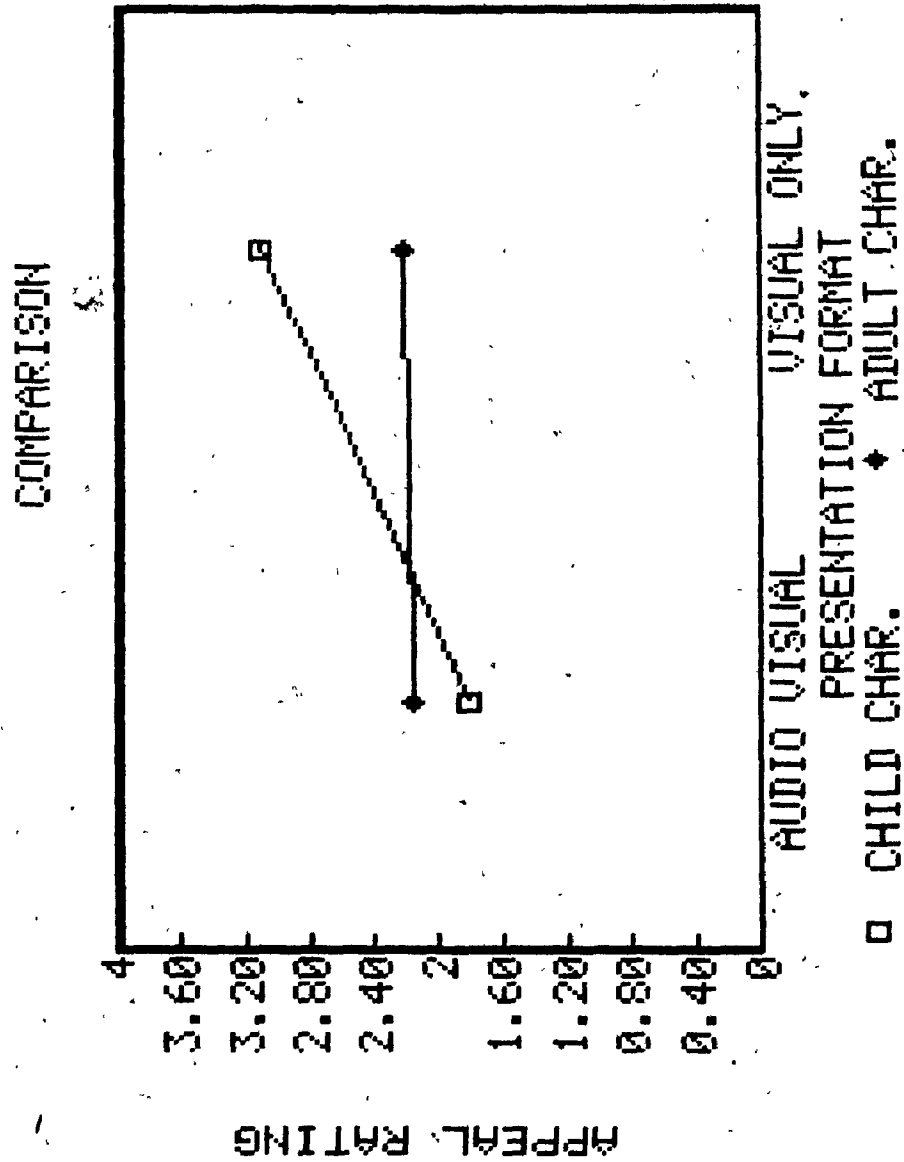


Figure 11. Ratings for children versus adults in the audio-visual and visual only presentations.

Interaction 2

The second interaction involved Viewers' Age and Repetitions, $F(8,278) = 1.96, p < .05$. The four year olds responded differently than did the older children. Their responses were less variable and thus their mean responses did not change appreciably over time. Their reactions were consistent over time, illustrated by a mean response over three repetitions that consistently hovered near the mid range of zero. Also their responses did not change uniformly over the three repeated viewings. Whereas the other two age groups both diminished their appeal ratings over time, the four year olds showed no consistent pattern. This finding is depicted in Figure 12.

INTERACTION : AUD-AGE/REPT

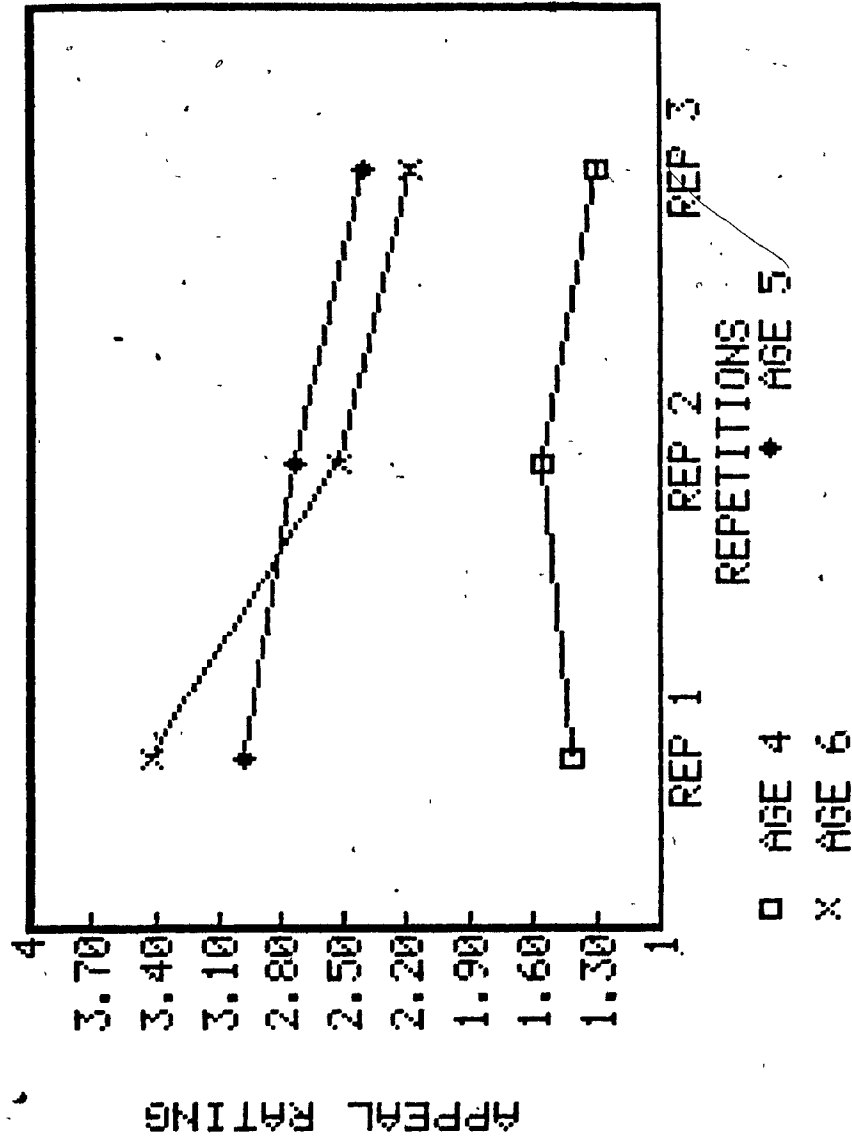


Figure 12. Appeal ratings over three separate viewings of the characters isolated by audience age.

Interaction 3

The final interaction; a three-way interaction between the Presentation Format, Segments and Repetitions, was beyond the scope of this study. It does however illustrate the concept of factor complexity that was discussed earlier.

Main Effects

With the interactions identified, main effects were assessed. Of the five main effects one was found to be significant.

The factor of Sex of Viewer showed significant differences, $F(6,139) = 3.29, p < .01$. The female population tended to be more positive in their assessments of all characters less one. (See Figure 13)

The first main effect of Presentation Format, showed no significant differences between the appeal ratings given by those children watching the program with sound as compared to those watching a silent version. This result allowed the pooling of this factor in Stage III of this experiment.

MAIN EFFECT:SEX OF VIEWER

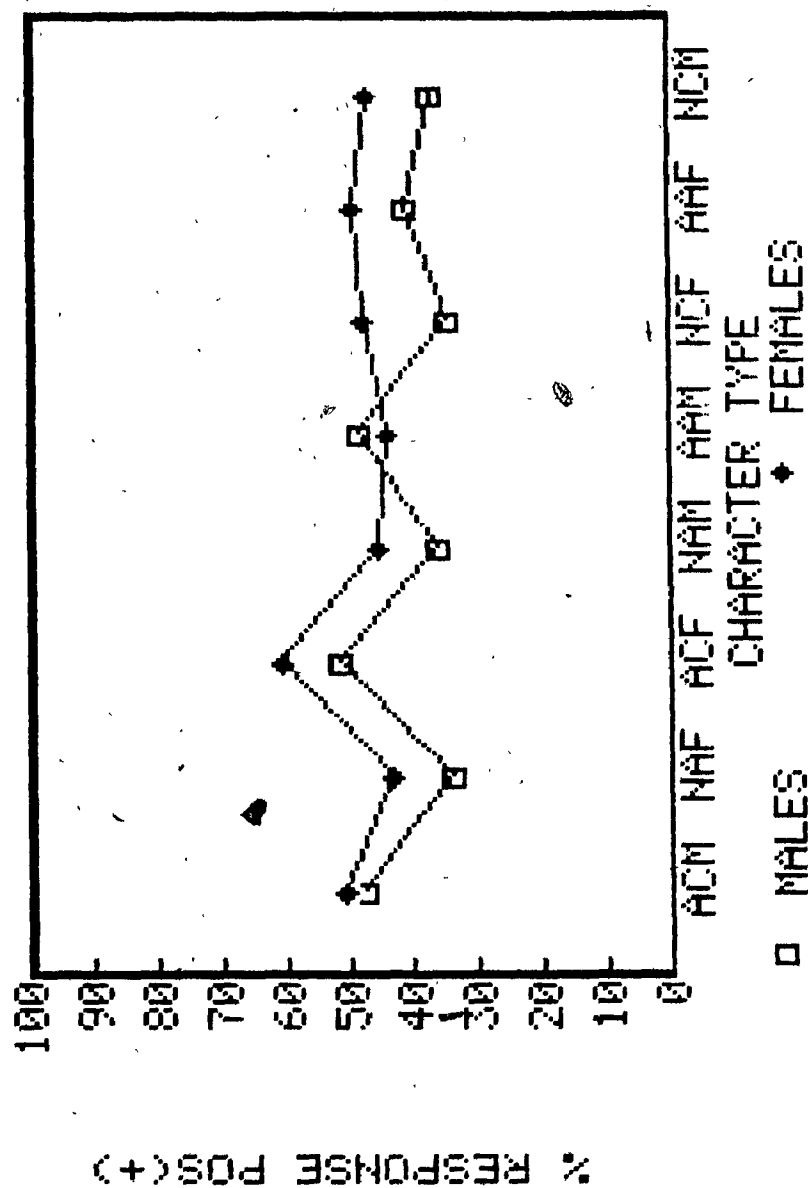


Figure 13. Appeal ratings for all eight characters separated by sex of viewer.

Stage III: 4-way Anova

Stage III of this experiment represents a $3 \times 2 \times (8 \times 3)$ design where Presentation Format has been pooled. This pooling increased the cell sizes, on average, by 100%.

No interactions were detected in this stage of the experiment. The previous significant main effect was replicated with the addition of a significant main effect for Age of Viewer, $F(2,145)$, 3.18, $p < .05$. Over all, four year olds found all characters less appealing than did their older classmates. As was illustrated previously the four year olds showed a consistency over time in their appeal ratings that the older children did not.

Comparisons of Segments:

The segments showed a significant difference across the eight characters, $F(7,973) = 11.88$, $p < .001$. An additional analysis on these eight characters was conducted to identify the nature of this effect. Each cell of subjects was assessed individually across the eight segments using a 1-way Anova in each case.

The eight segments were identified as being either significantly different in appeal ratings in either a positive or negative direction. The results of each Anova were tallied, resulting in total positive significant effects and total negative significant effects. These tallied scores were then interpreted to indicate characters that were

rated highly appealing or unappealing. Results as illustrated in Table 2 show the mean response for each character in each one-way analysis over each of the three repetitions. Those showing significant differences at the $p = .05$ level are labelled with one asterisk, those significant at $p = .001$ are labelled with 2 asterisks. Significant effects are also labelled with the direction of their result in either a positive or negative direction. Final results, those being the sum of positive and negative significant differences are given in Table 3.

Animated characters showed high appeal ratings. Other attributes, such as age and sex of character, showed no distinct patterns. Table 3 clearly illustrates those characters that are popular. The Animated Child Female (ACF) (+7 rating) would be judged as highly popular and the Non-animated Adult Female (NAF) (-9 rating) would be noted as having a rather negative effect on the audience.

Table 2: RESULTS OF ONE-WAY ANOVA ON THE MEAN RESPONSES FOR EACH CHARACTER TYPE

AUDIENCE	N	REP	ACH	ACF	AAH	AAF	NCH	NCF	NAH	NAF
4YR MALE	24	1	2.21	3.33	2.04	2.08	2.08	1.46	1.77	-0.33(-)**
		2	2.29	3.33(+)**	3.33(+)**	2.17	-1.17(-)*	-0.71	1.17	0.92
		3	1.83	3.08	4.17(+)**	2.67	0.04	0.21(-)*	2.20	1.29
4YR FEM.	19	1	1.79	3.16	-1.79(-)**	2.84	2.47	1.95	-0.53	-1.21(-)*
		2	1.89	3.26	1.16	1.58	1.74	0.53	1.58	2.00
		3	-0.47	1.79	-0.58	0.84	1.47	0.05	1.84	0.63
5YR MALE	29	1	2.41	4.34(+)**	4.93(+)**	4.07(+)**	0.38(-)*	0.83	2.79	-0.66(-)**
		2	2.66	4.24(+)**	3.79(+)**	2.59	1.03	0.55	1.52	0.03
		3	2.90	2.14	3.72(+)**	0.83	1.76	0.69	3.17	-0.34(-)*
5YR FEM.	30	1	2.97	6.63(+)**	2.97	6.33(+)**	1.30(-)*	2.07	4.30	2.23(-)*
		2	4.27	4.67	3.70	4.63	1.50(-)*	3.33	4.83	0.70(-)**
		3	3.93	4.20	3.40	4.07	0.33(-)*	2.87	5.23(+)**	-0.17(-)**
6YR MALE	21	1	3.95	4.76(+)**	3.19	4.71(+)**	1.95	0.10(-)*	1.52	0.52
		2	4.57(+)**	1.81	2.95	2.81	0.86	1.62	-0.57	1.57(-)**
		3	1.95	2.43	2.00	1.67	1.43	0.10	0.86	0.90
6YR FEM.	28	1	3.75	5.79(+)**	3.86	5.57(+)**	3.61	4.93	3.75	3.07
		2	4.25*	5.29	3.39	3.71	3.00	4.29	2.39	1.75
		3	4.00	5.86(+)**	2.04	4.00	1.71	4.50	1.54	0.11(-)**

* significant at $p = .05$ ** significant at $p = .001$

Table 3: SUMMARY OF ONE-WAY ANOVA RESULTS

	SEGMENTS							
	ACM	ACF	ARM	AAF	NCM	NCF	NAM	NAF
TOTAL POS. EFFECTS	1	7	5	4	0	0	1	0
TOTAL NEG. EFFECTS	0	0	1	0	5	2	0	9

Discussion

Limitations

Though the intent of the study was to evaluate the effects of a number of factors in a real-life fashion, the use of Anova tests demanded more control than was exercised. All efforts, short of original design and production of each character, were made to produce eight TV segments that depicted well defined character types. The segments intended to portray these characters in a manner similar to the broadcast situation and in a context that did not seem contrived. This decision gave rise to some conflicts.

Though extensive editing was performed to control for other factors, there was evidence of other attributes present on the screen. They included various types of animation, various backgrounds, close-ups and full shots. Other factors such as humour and pacing may have been playing their part in each of the segments. Thus there is a confounding of factors beyond that introduced in the analysis of the study. The nature of the segments makes them impossible to assess, leaving only four factors that are interpretable, those being the lack or presence of sound, age of viewer, sex of viewer and repetitions.

The elimination of the segment factor made Stage III of the analysis unnecessary. It was the intent of the study to collapse the three confounded variables of Production Technique (Animation versus Non-Animation), Age of Character and Sex of Character into one factor.

called Segments and then test for a significant main effect on this factor. A series of 1-way Anovas were conducted to tease out the character attributes responsible for the significant differences. The results of these 1-way Anovas are uninterpretable because of the confounding factors discussed earlier but are presented within the body of results to provide a complete account of the study.

Regardless of this extra confounding in the segments it was established that Stage III of the study would still be unnecessary. The 5-way Anova is capable of producing the necessary comparisons required to identify the source or sources of variance.

Thus the results of the 5-way Anova are limited to only two significant effects. Firstly the 2-way interaction between Age of Viewer and Repetitions and a significant main effect for Sex of Viewer.

The following discussion deals solely with the significant effects found in the 5-way Anova and the findings produced through use of the PEAC system.

Sound Track

The types of sound used in this study, as defined in a previous section, were found to have little effect. While collecting the data, children seemed as pleased to watch the silent version as they were to watch the one with sound. No appreciable change in subject behaviour

was observed.

Theories that state that sound is used as an attention grabber, were not tested in this experiment. Admittedly, if the sound track had meant to stimulate attention after a slow segment, it could have been made to do so. But sound, as it was used here, was merely a background to the images. This factor did not effect the appeal of the characters.

Children were not made more active or less active due to the presence of sound, certainly there was no evidence of the hyperactivity that is reported to accompany many of the Sesame Street segments.

Appeal of character must therefore be the result of other, non-auditory, non-verbal attributes or a result of other factors in combination with sound. The use of sound that is general in nature and not of a particular genre appears nondetrimental to a character's natural appeal.

Age of Viewer

The interaction of Age of Viewer and Repetitions was one of the more informative results.

It appears that four year old subjects performed differently than did their five and six year old classmates. This difference was particularly evident over the three repeated measures.

Firstly there was no evidence that the four year olds were unable to perform adequately for the experiment. They viewed the tape and responded readily. No evidence of confusion, lack of dedication or interest was observed during the nine separate sessions. However, the results generated by each of the age groups varied considerably.

Children of all ages diminished their appeal ratings for all characters after having seen them a second time. This decrease follows a pattern for all ages. There is considerable variability on appeal rating upon first viewing. As children increase in age the appeal rating upon first viewing was higher. The six year olds gave the highest appeal rating during the first repetition, the four year olds provided the lowest rating overall for all characters on first viewing.

Decrease in appeal occurred from first viewing to second for the five and six year olds but four year olds increased their ratings slightly. This could be due to an older child's ability to evaluate a character more critically over time. Perhaps the older children were more easily bored than were the four year olds.

The striking observation in this interaction is the overall low rating given to the characters by the four year olds as compared to the older children. The ratings over three repetitions given by the four year olds was more consistent over time and illustrated less variability than did the ratings of the five and particularly the six year olds. Obviously something is happening during this ageing process

that has made the five and six year olds more positive and more sensitive in their assessments of appeal. Contrary to observations made during the testing process, four year olds may not be as capable as the older children in pressing the buttons. A further study of the process, including the calculation and analysis of null responses would help clarify the source of this variability. However a careful study of Figure 12 may help support the idea that nulls would have no bearing on the interaction between Age of Viewer and Repetitions.

If the number of nulls for each age group can be expected to remain static in relation to one another, then indeed the result of the age and repetition interaction, with nulls accounted for, may not vary greatly. If each of the age groups are deficient in the act of pushing the buttons in varying degrees, then the graph's shape may not change. Only the quantity of responses would vary. The relationship over time would still be intact, only the intensity of appeal for the characters would be in question. The result which states that appeal diminishes with time for children ages four through six would be unaffected.

Further study of the nulls would be required to establish this contention. Different procedures, some currently in use may help control this issue of null responses. Many data collectors insist on observing and measuring the children as they watch. This ensures proper use of the collection device because it is the observer who uses the hand unit. This method adds a new source of variance considering the need for up to twenty three observers for twenty three children.

Obviously such problems can be worked out using smaller groups or by

having one observer monitor more than one child. This limitation of group size however eliminates a portion of the study that attempts to measure childrens programming in a setting that many preschoolers are currently in, that being day care centres or pre-kindergartens. Because children often watch educational television in the large group setting they should be measured within this environment.

Use of the PEAC units in any other fashion, short of use by the viewer, seriously hampers its dynamism. The moment-to-moment evaluation is questionable if intermediaries are needed. There is a lag in the results. There is a subjective component above and beyond that brought to the session by the subject, that being the observer. The value of such data collection lies in its immediacy. Further evaluation of its use with children may give rise to modifications in the equipment itself or in the procedures used that may eliminate the issue of null responses due to a child's lack of ability to press the buttons.

With this in mind, the result found in regards to repetition and loss of appeal will require further investigation. A natural extention of this study to test the effect of repetitions may involve the comparison of three situations; 1) ratings of the characters over three repetitions in the same program, 2) more than three repetitions in the same program and 3) ratings for characters over a number of programs on separate days.

How many more repetitions can a four year old view before the

appeal ratings tail off or indeed show a significant increase? How many more repetitions can the older children observe before a character's effectiveness becomes almost counter productive?

Because learning and repetition have been shown to be positively related, these findings illustrate a trade off on the part of Sesame Street's decision to repeat segments over the same week. There is a risk that older viewers may be losing interest in the characters that appear frequently. A further experiment with segments shown in their entirety may show a different result for these older children.

Because the broadcast versions of these characters involved some plot structure it is expected that the character appeal and certainly the learning value for these segments would increase for the older children. The theory is supported in this experiment. The experimental versions of these segments were free of any meaningful content. If the older children were looking for content, they didn't find it in these viewings. Even though it has been shown that older children (> 6 yrs.) maintain an attraction for the salient attributes, the character appeal suffered for the lack of plot structure. Because younger children are more attuned to the salient attributes of a character it is surprising that they did not rate the characters more positively than did the older children.

The four year olds should be studied further to determine the effects of more than three repetitions during a one hour period.

Further study would be necessary to determine the effect of repetitive segments over many days.

The decision to repeat segments during a one hour program shows no detrimental effect on a character's appeal at least for four year old viewers. In fact the results indicate a greater acceptance by the four olds for characters shown a number of times. As discussed earlier, a study that included the calculation of null responses would provide further insight into the roll of nulls in this effect. If the four year olds' ratings are due in part to their lack of pressing any button then the results could be due to other factors. Essentially the study would be tailored to interpret the null responses in this type of situation. Though observations during the data collection phase indicated a capability to participate adequately on the part of four year olds, an interobserver reliability test would be helpful to measure the effectiveness of four year olds using the PEAC system and determine accuracy of data collection on the part of this tool.

Repetition

Character ratings provided by the five and six year olds were uniform. As children viewed each character three separate times, their character appeal dropped. As discussed earlier, four year olds did not follow this pattern. If the older children are indeed more reliant on plot structure, then this tendency to lose appeal may be reversed in a true broadcast situation. The older children would have been given the content they desired, and character appeal may not have tailed off as it did in this experiment. Four year olds on the other hand provided no

trends related to repetitions.

Character Assessment

Of the eight characters studied, the PEAC findings can clearly support the following.

1) That three of the animated segments be retained and that production techniques used in each be identified and used in future production.

These segments include:

- The Animated Child Female (ACF), a segment, where, in the original uncut version, a young girl is day dreaming of what she will be when she grows up. This segment, of all tested, was the most positively received.

- The Animated Adult Male (AAM), this segment depicted a man who was exercising, and running an obstacle course. This one segment also involved some slapstick humour, this was evident despite lack of sound track or plot. This segment, beyond receiving high character appeal ratings, experienced a high recall from the children, during discussions held after the viewing.

- The Animated Adult Female (AAF), this segment depicted a rather impatient Queen, who got her robe caught in the palace door.

The only other animated segment involved the Animated Child Male (ACM). In its uncut version, this segment involved a small boy chasing after his father, constantly trying to keep up, yelling "Attende Papa, Attende." Of all animated segments, this was rated significantly lower. Out of context the visuals were very simple, the action very

restrictive and uninformative. It may have been very difficult for children to imagine a satisfactory scenario to accompany this spot. I would however not recommend that this segment be deleted without further study of its effectiveness in its true context.

2) That two segments be deleted, reworked or reevaluated:

-The Non-Animated Adult Female (NAF). This segment, in its original version, depicted a typical elementary school where a young preschooler was visiting to see what school was like. The cut version, used to test this character, showed the older adult female teachers working in the classroom. No children were depicted, certainly nothing of the original scenario remained. Despite this, it is overwhelmingly clear that the children did not find the older women appealing. Not a good association for young children who may be starting school soon.

-The Non-Animated Child Male (NCM). This scenario originally titled Zachary Bakes a Cake, showed a young boy doing exactly that, baking a cake. In isolation, without a scenario the character did not provide sufficient positive features to maintain interest. Again I would hesitate to eliminate such a segment without further study of the character within its original context.

The first of two other Non-Animated Adults, depicted an older man combing his hair with a banana. Despite all efforts to break the segment down into scenes without a plot. The children constantly picked up on the gentleman's expressions and the banana. This character had a

slightly higher than average appeal rating, and the segment was recalled often during the discussion periods. Still this segment scored much lower than the animated programming. Recommendations to retain and further develop this character would be in order.

Lastly the Non-Animated Child Female (NCF) was one of the less memorable characters. In the original scene, a young girl is cutting out symmetric patterns on paper. This character was rated slightly negative by the children. It was by far the least recalled by both the children and those who conducted the test.

Conclusions

The concept of factor complexity, introduced earlier, is well illustrated in this study. Certainly many of the main findings must be reported with reference to a number of factors. The message that must therefore be given to producers of children's television is that the success of their their work is dependent on a carefully interwoven tapestry of viewers, characters, situations and production techniques. More importantly this study indicates that these interwoven factors can be measured and measured economically using the PEAC system.

Had the study followed a more pragmatic protocol, a protocol dictated by time and budget constraints and the need for some easily interpreted data, then it would have been designed, conducted and assessed in exactly two and a half weeks. The results, in their most terse format, would have consisted of a one page graph. Simplistic, but

not far from reality, this type of turn around in the summative phase of production research is essential. Strong inference, is not a requirement of the production setting. Valid data, assessed by a competent producer can be enough to produce good educational television. In the ideal situation, findings of this sort derived from graphs, would require further testing using another method. Certainly the use of observations and post-test interviews would provide information to substantiate the PEAC results or provide additional information not evident on the graph. The use of multiple assessment tools helps avoid the loss of good programming due to chance factors and the misinterpretation of results in a very subjective process.

This parallel assessment of character appeal has shown the benefits of both a subjective summative evaluation using the PEAC system and a strict analytical evaluation of the data using traditional analysis of variance.

The PEAC software is a dynamic tool that is fast, informative and easy to use. Such a tool, designed for use by children as young as four, provides special benefits for those involved in preschool television production.

The Anova analysis provided further, more specific results regarding the less salient characteristics that played important roles. It also added statistical rigor to the study and helped substantiate the findings suggested by the PEAC system. The two tools in combination

could provide a most thorough assessment of the experiment's findings. Future studies in the academic milieu, as it relates to educational television would benefit from such a dual analysis. The problems inherent in the process involve issues of internal and external validity. In efforts to provide information based on real situations, research attempts to make the results generalizable to a wide audience. The cost of such an approach is evident in this study. Uncontrolled variables do not lend themselves to a rigorous assessment of the situation. The true nature of the TV viewing situation, as stated clearly in the objectives section of this study, is a complex one, where many factors are in constant flux. A decision thus has to be made. Testing in a sterile laboratory with all factors held constant, except the independent factor, will provide defensible results but results not highly applicable to the real situation. Studies that test live broadcasts with live audiences provide highly sensitive data for that particular program and audience but the interpretation of such results are highly subjective and do not lend themselves well to the process of establishing good theory.

The study has attempted to make contributions to both the practical and theoretical areas. Establishing firm ground between the producers and theoreticians has proven difficult, but the significant differences identified have proven interesting for both.

Animation

Though the 5-way Anova results cannot substantiate the results of

the PEAC analysis it seems evident that beyond all else, television can maintain a child's interest and a character's appeal at no higher a level than by animating that character. This is an attribute that seems to have no rival in children's TV. The results clearly support the animated segments regardless of character age, viewer age, or sex of character. Animation provides strong visual prompts. As in any good caricature, the eyes, the mouth, the posture are accentuated. Bigger than life, they provide a clear line of communication for the child. The expressions are less complicated and free of the more complex images provided by the real human face. Arguments can be made that children are more attuned to animation because all children's television is animated. This is not substantiated by this study. The televised messages were non-verbal, lacking a well defined plot structure. In some cases the segments could have been for either adults or children. Yet the animated segments were consistently rated as more appealing.

Certainly the findings don't provide reason for a fully animated format. The use of other techniques could prove to be as effective in another study. Actors that are themselves very "animated" in their mannerisms are popular with children. The Non-animated Adult Male in this study rated high and was often recalled by the children. He was very animated. He provided a lot of eye contact, was extreme in his expressions and wore colourful clothing. Intermediaries are also good substitutes for satisfying a child's craving for animation. Puppets and dummies are good standbys in any case and help illustrate a common vein

in all children's entertainment, bigger than life is better than the real thing.

Repetitions

Repetition is a numeric rather than qualitative factor. Given characters of equal appeal, how much is too much? This provides a most intriguing question for further research. Findings illustrated a difference in the preschool children based on age. The three repetitions provided little information on how the four year olds were reacting to the characters over time. The five and six year olds were quite deliberate in their ratings. The more they saw a character the less they liked it.

Considering the reaction of the older children for the moment, it would be interesting to measure their reactions over an extended period. Would repeated showings completely extinguish the character's appeal? Repetitions over days would likely elicit a recurring wave in the appeal curve. Certainly a small amount of recovery could be experienced each day whereby the process of extinguishing the appeal rating would take longer. This is more likely the case with Sesame Street characters now.

Also, if five and six year olds are so dependent on plot structure, how then would the character appeal change over these three repetitions if a plot was included. We may find that older children express an increased appeal for each character over the three

repetitions if the scenarios are more complex.

As for the four year olds, this extinguishing of appeal was not displayed. Whether they were unable to remember the characters or whether they simply did not feel as strongly about the characters as did the older children, it is difficult to determine. Further study is required to identify this relationship. In particular the study of null responses would identify their role in the findings.

Lastly, the issue of sex of viewer is difficult to interpret within a study such as this without a thorough review of the relevant literature.

Sociological research has evaluated the differences demonstrated in many facets of male and female behaviour. The results drawn from this study support some findings of researchers in this area of Psychology.

There was a positive response bias throughout the experiment for all subjects. Females significantly rated all characters higher than did the males. This need on the part of the girls to provide positive responses may be due to a number of factors. The data collection process was carried out in mixed groups. The data collectors in all cases were couples, male and female in each case. It seems unlikely that the children were reacting to any sex bias in the study procedures. If females are expected to be more positive than males,

more supportive and more nurturing than males then the results may be a direct result of this phenomenon. The sociological theory which deals with female and male stereotyping may apply in this situation. It would suffice to say, in regard to this restrictive sample, that the characters studied were more appealing for the girls than they were for the boys. Statements beyond this would involve the review of extensive sociological studies involving the complex topic of sexual typing. Certainly a more controlled experiment, designed to evaluate this factor, would be in order.

Lastly, the experiment suggested that a relationship between recall and humour or plot structure may exist. Those characters that were inherently humorous or whose actions were easy to predict showed high levels of recall in our post test discussions. A further study of humour and its effect on recall would prove informative.

References

- Alwitt, L. F., Anderson, D. R., Lorch, E. P. & Levin, S. R. (1980).
Preschool children's visual attention to attributes of television.
Human Communication Research, 7, 52-67.
- Alyward, T. J. Jr. (1960). A study of the effect of production
technique on a televised lecture. Dissertation Abstracts, 21,
1660-1661.
- Anderson, B. F. (1966). The Psychology Experiment. Belmont, California:
Wadsworth.
- Anderson, C. M. (1972). In search of a visual rhetoric for
instructional television. AV Communication Review, 20, 43-63.
- Anderson, D. R. & Levin, S. R. (1976). Young children's attention to
"Sesame Street". Child Development, 47, 806-811.
- Baggaley, J. P. (1978). Television codes and audience response. Journal
of Educational Television, 4, 24-29.
- Baggaley, J. P. (1980). Psychology of the TV Image, New York: Praeger.
- Baggaley, J. P. (1986). Design of a TV character with visual appeal for
preschool children. Journal of Educational Television, 11, 41-48.
- Baggaley, J. P. (1986). Formative Evaluation of Educational Television.
Canadian Journal of Educational Communication, 15, 29-43.
- Baggaley, J. P. & Duck, S. W. (1976). Dynamics of Television.
Farnborough: Saxon House.
- Brecht, M. & Woodward, J. A. (1983). Instruction Manual for Ganova: An
Interactive Microcomputer Statistical Program. Los Angeles,
Calif.: University of California in Los Angeles.

- Cambre, M. A. (1981). Historical overview of formative evaluation of instructional media products. Educational Communication and Technology Journal, 29, 3-25.
- Coldevin, G.O. (1975 a). The effects of voice-over, superimposition and combined review treatments as production strategies for ETV programming. In Baggaley, J. P., Jamieson, G. H. & Marchant, H. (Eds.), Aspects of Educational Technology VII. London: Pitman.
- Coldevin, G. O. (1975 b). Spaced, massed and summary treatments as review strategies for ITV production. AV Communication Review, 23, 289 - 303.
- Coldevin, G. O. (1980). Formative research in television presentation strategies: guidelines for effective production. In Baggaley, J. P. (Ed.), Experimental Research in TV Instruction. St. Johns: Memorial University of Newfoundland.
- Coldevin, G. O. (1981). Experimental research in television message design: implications for ETV. Programmed Learning & Educational Technology, 118, 92-105.
- Coldevin, G.O. & Bernard, M. (1983). Learning from television: effects of presenter delivery style. In Percival, F. & Ellington, H. I. (Eds.), Aspects of Educational Technology XV. London: Kogan Page.
- Cook, J. O. (1960). Research in audio-visual communication. Research, principles and practices in visual communication. East Lansing: Michigan State University, National Project in Agricultural Communications, 91-106.
- Feshbach, S., & Singer, R. (1971). Television and aggression: An experimental field study. San Francisco: Jossey-Bass.

- Greenhill, L. P., Rich, O. S., & Carpenter, C. R. (1962). The educational effectiveness, acceptability and feasibility of the Eidophor large-screen television projector. University Park, Pa.: Division of Academic Research and Sciences, Pennsylvania State University.
- Heider, F. (1958). The Psychology of Interpersonal Relations. New York: Wiley.
- Himmelweit, H. T. (1958). Television and the Child. London: Oxford University Press.
- Hoban, C. F. (1956). Research and reality. AV Communication Review, 4, 3 - 20.
- Huston-Stein, A. & Wright, J. C. (1979). Children and television: effects of the medium, its content and its form. Journal of Research and Development in Education, 13, 20 - 31.
- Jennings, C. (1980, November). The Impact of TV Cartoons on Child Behaviour. Paper to National Association of Educators of Young Children.
- Kanner, J. H. & Rosenstein, A. J. (1960). Television in army training: colour versus black and white. Audio-Visual Communication Review, 8, 243-252.
- Kelly, C. F. (1964). The efficacy of television in the schools. Dissertation Abstracts, 24, 224.
- Kelley, H. H. (1967). In Levine, D. (Ed.), Nebraska Symposium on Motivation, Lincoln: Nebraska University Press.
- Keppel, G. (1982). Design and Analysis (2nd ed.). Englewood Cliffs: Prentice-Hall.

- Krull, R., Watt, J. H. & Lichty, L. W. (1977). Entropy and structure: two measures of complexity in television programs. Communication Research, 4, 61-86.
- Lesser, H. (1977). Television and the Preschool Child. New York: Academic Press.
- Link, J. D. (1961). A comparison of the effects on learning of viewing film in colour on a screen and in black-and-white over closed circuit television. Ontario Journal of Educational research, 3, 111-115.
- Lorch, E. & Anderson, D. (1983). Highlights of "Paying Attention to Sesame Street". A CBC internal document summarizing the results of a study commissioned by The Children's Television Workshop.
- Lumsdaine, A. A., Sulzer, R. L., & Kopstein, F. F. (1953). The influence of simple animation techniques on the value of a training film. Human Resources Research Laboratories (Report No. 24), April, 1951, Audio-Visual Communication Review, 1, 140-141.
- Maccoby, E. & Feldman, S. (1972). Mother-attachment and stranger-reactions in the third year of life. Monographs of the Society for Research in Child Development, 37.
- Melody, W. (1973). Children's Television: The Economics of Exploitation. New Haven: Yale University Press.
- Mielke, K. W. (1983). Formative research on appeal and comprehension. In Bryant, J. & Anderson, D. R. (Eds.), Children's Understanding of Television. New York: Academic Press.

- Mielke, K. W. & Chen, M. (1980). Making contact: formative research in touch with children. In Baggaley, J. P. (Ed.), Experimental Research in TV Instruction. St. John's: Memorial University of Newfoundland.
- Munn, N. L., Fernald Jr., L. D., & Fernald, P. S. (1972). Basic Psychology. Boston: Houghton Mifflin Company.
- Mussen, P. H., Conger, J. J., & Kagan, J. (1974). Child Development and Personality. New York: Harper & Row.
- Nickerson, R. B. (1979). The formative evaluation of instructional television programming using the program evaluation analysis computer (PEAC). In Baggaley, J. P. & Sharpe, J. (Eds.), Experimental Research in TV Instruction. St. John's: Memorial University of Newfoundland.
- Palmer, E. L. (1972). Television instruction and the preschool child. International Journal of Early Childhood, 4, 11-17.
- Pfleiger, E. F. & Kelly, F. C. (1961). The national program in the use of television in the public schools. New York: The Ford Foundation and the Fund for Advancement of Education.
- Reede, A. H. & Reede, R. K. (1963). Television instruction in elementary economics. Industrial Research Bulletin No. 5. University Park, Pa.: College of Business Administration, Pennsylvania State University.
- Reich, C. & Meisner, A. (1972). A comparison of colour and black and white TV. University of Toronto.

- Ruffing, C. S. (1967). A Study of the Form and Function of Instructional Television Curriculum Committees. Unpublished doctoral dissertation, Michigan State University.
- Rummel, R. J. (1970). Applied Factor Analysis. Evanston: Northwestern University Press.
- Schramm, W. (1962). Learning from instructional television. Review of Educational Research, 32, 156-167.
- Schramm, W. (1972). What the research says. In Schramm, W. (Ed.), Quality in Instructional Television. Honolulu: University of Hawaii Press.
- Schramm, W., Lyle, J. & Parker, E. B. (1961). Television in the Lives of Our Children. Toronto: University of Toronto Press.
- Shannon, C. E. & Weaver, W. (1949). The Mathematical Theory of Communication. Urbana: University of Illinois Press.
- Shepherd, J. R. A comparative analysis of production techniques found in randomly selected commercial and educational programs. ERIC ED
- Swets, J. A. (1964). Signal Detection and Recognition by Human Observers. New York: Wiley.
- Sykes, R. E. (1964). The effectiveness of closed-circuit television observation and of direct observation of children's art classes for implimenting elementary teacher's training in art education. Dissertation Abstracts, 25, 2387.
- Wade, S. (1967). Hagerston: a pioneer in closed-circuit televised instruction. New educational media in action: case studies for planners I. Paris: Unesco International Institute for Educational Planning, 59-82.

- Wartella, E. & Ettema, J. S. (1974). A cognitive developmental study of children's attention to television commercials. Communication research, 1, 69-87.
- Webster, B. R. & Cox, S. M. (1974). The value of colour in educational television. British Journal of Educational Technology, 5, 44-60.
- Wright, J. C. & Huston, A. C. (1983, July). A matter of form: potential of television for young viewers. American Psychologist, 38, 835 - 843.
- Zettl, H. (1968). The study of television aesthetics. Educational Broadcasting Review, 2, 36-40.

Appendix A

VERBAL INSTRUCTIONS FOR SESSION LEADER

Hi! My name is _____, and my friend's name is _____. We have come to visit you today for one very important reason...we need your help!...and I'll explain why.

You see _____ and I go to a big school downtown and in that school we have a computer. Does anyone know what a computer is?... (Await and feild responses as necessary)

Well pur computer helps us a lot. In fact he helps us so much and is so friendly that we named him "Peaceful". Would you like to see a picture of him?... (Await responses...show picture No. 1.)

He's kind of cute isn't he!?

Peaceful has only one job to do. He likes to talk to children, just like you, and find out what you think about television. So he visits a lot of children all over Montreal asking them what they like and what they don't like about TV.

But there is only one problem!

Peaceful is so big we can't get him through the door. So _____ and I thought of a solution for our problem. We decided to get Peaceful

some little helpers. Would you like to see a picture of one of his helpers? (Await responses...show picture No. 2.)

The helpers are a lot smaller!...see? You can hold them in your hands. Everyone is going to get a helper of his own today. But before we pass them out, I'll tell you how to use the helper. I'm going to use a big picture of a helper so everyone can see...here it is! (Show picture No. 3.)

Now the only way you can talk to Peaceful is by telling the helper. So while you watch TV this morning Peaceful would like you to press the buttons on the helper. Let me show you how it works.

There are two buttons on your helper, up here at the top. On top of one button you see this. (Pointing to template)...What is this? (Await responses)...Right, its a happy face!

What do you see on top of the other button? (Await responses)...Right, its a sad face.

So let's imagine for a minute that you're watching TV and you see something you like. How would you tell Peaceful that you liked it? (Await responses...correct as often as necessary to insure comprehension). Right, you'd push your happy face button as long as you see something you like. Now suppose you get a little bored, or you see something on TV that you don't like, what would you do? (Await

responses...correct as often as necessary to insure comprehension).

(Summarize instructions once more, emphasize constant pressing)

Now we are going to get our helpers in a minute and practise pressing our buttons/ but before we do that I must tell you something very important!

You cannot talk while you watch TV today!... You see, if you talk, Peaceful will become confused. Remember...the only way you can talk to Peaceful is by pushing the buttons on his helper. So we must all be really quiet. Can you do that? (Await responses)

(Pass out response units, record first names and corresponding unit numbers.)

Does everyone have a helper? (Verify)

Does everyone see their happy face button? (Await responses) Does everyone see their sad face buttons? (Await responses)

OK, now we are going to practise, using pictures. I will hold up a picture and if you like it, you will push what button?... (Await responses...correct if necessary) If you don't like what you see, what button will you push?... (Await responses...correct if necessary)...Are you allowed to talk while you push your buttons? (Await responses) Right!...You are all very good listeners today. O.K., let's start.

(Allow for three minute practice time with five separate

photographs (8 X 11" in colour), correct any problems, reinforce the need for silence and continuous pressing using the teacher as an enforcer)

Is everyone ready?

(Explain lack of sound if subjects are slated to receive visual-only treatment)

As soon as you see the first TV picture on the screen, start pushing your buttons and keep pushing them until the picture goes black. I will tell you when to stop.

(Turn on VCR)