DOCUMENT RESUME

ED 062 021 PS 005 631

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TITLE Analysis of Social Skills Development in the Appalachia Preschool Education Program.
INSTITUTION Appalachia Educational Lab., Charleston, W. Va.
REPORT NO TR-18
BUREAU NO BR-6-2909
PUB DATE Dec 71
NOTE 49p.

EDRS PRICE MF-$0.65 HC-$3.29
DESCRIPTORS Child Development; Classification; Comparative Analysis; *Educational Programs; Factor Analysis; *Interpersonal Competence; Objectives; *Observation; Oral Communication; Peer Relationship; Preschool Children; *Preschool Education; Response Mode; Sex Differences; *Statistical Analysis; Stimuli; Task Performance
IDENTIFIERS *Appalachia Preschool Education Program

ABSTRACT

The second phase of the study of social skills development in the Appalachia Preschool Education Program is presented. A standardized situation in which children would have an opportunity to demonstrate those skills was devised. Three treatment groups were included in the program. Sex of the child was used as a factor. One purpose of this study was to determine whether differences in social skills development existed among three groups of children ages 3 to 5 who were in the program. The observational system consisted of 27 categories of social skills. These fall under six major classification--initiation, question or request for help, giving help, refusing help, group consciousness, and response to peer. It was found that the groups receiving two and three components of the program had more positive verbal responses than the group receiving only one and that the 3- and 4-year-olds explored the situation around them significantly more than the 5-year-olds. Responding constructively was significantly more characteristic of the 4-year-olds. There were three important outcomes of this study: (1) It was shown that a task can be created for preschool children which will elicit from them, in a natural and spontaneous manner, important social skills behaviors; (2) In order to develop social skills in preschool children, it is necessary to provide socialization opportunities through contacts with others outside the home; and (3) Social skills in preschool children can be recorded under a systematic observation plan, are measurable, and can be analyzed statistically. (Author/CK)

Analysis of Social Skills Development in the Appalachia Preschool Education Program

Technical Report No. 18

December, 1971

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Analysis of Social Skills Development in the Appalachia Preschool Education Program

This report covers the second phase of the study of social skills development in the Appalachia Preschool Education Program. The development of a system for observing, recording and analyzing the behavior of preschool children was started at the time that the study began in 1970.

In order to permit systematic observation of social skills, it was necessary to devise a standardized situation in which children would have an opportunity to demonstrate those skills. Further, it was necessary that the situation be one which involved the participants in a task with little or no teacher involvement.

The 1970 and 1971 studies differ in two respects--a different task and a slightly different experimental design. The task is described in a later section.

Last year only two treatment groups--the TV-HV-MC and the TV-HV--were used; this year the TV only was included as a third treatment group. In 1970 "sex grouping" (all male, all female, or mixed group) was a third factor. Since the results did not show a sex group effect, that factor was dropped this year; in its place the sex of the child was used as a factor.

Research Design

Objectives

One purpose of this study was to determine whether differences in social skills development existed among three groups of children ages 3 to 5 who were in the Appalachia Preschool Education Program.

The first group watched the daily television program, Around the Bend (TV only); the second group was visited weekly by a home visitor (TV-HV)

in addition to watching the daily television program; the third group visited a mobile classroom once a week in addition to watching the daily television program and being visited by a paraprofessional (TV-HV-MC).

The Social Skills Category System

The observational system consisted of 27 categories of social skills. These are listed in Table 18.1. These 27 categories fall under six major classifications--initiation, question or request for help, giving help, refusing help, group consciousness, and response to peer.

The Task

The task used in last year's study involved placing model furniture in a model house.

That task failed to promote variation in social interaction. One reason for this failure was the fact that the activity did not require group cooperation for completion. In the present study, the task involved a battery-operated model train. The train moved on plastic tracks under the control of switches which the children manipulated to move the train forward and backward. The children were furnished plastic models of trees, buildings, people, and animals and told to place them in appropriate locations around the tracks.

Table 18.1

Social Skills Categories: An Observational System

Code No.	Category
Initiation	
11	Initiates constructive or neutral statement: a statement that does not impede the completion of the task or interaction between group members. Declarative statements to the teacher; verbal enthusiasm.
12	Initiates nonverbal constructive or neutral action to peer; shows or gives an object to peer.
13	Initiates antagonistic statement.
14	Initiates antagonistic action.
Question or Request for Help	
21	Asks a question of peer.
22	Requests assistance verbally of peer.
23	Requests assistance nonverbally of peer.
24	Asks a verbal or nonverbal question of the teacher.
25	Listens to the teacher or responds to teacher's question.
Giving Help	
31	Gives help on own initiative or in response to categories 22, 23 or as needed. This is nonverbal.
32	Gives help on own initiative when not needed. This is nonverbal.
Refusing Help	
41	Refuses request for assistance with good reason--verbally or nonverbally.
42	Refuses a reasonable request of assistance--verbally or nonverbally.

Table 18.1 (Continued)

Code No.	Category
Group Consciousness	
51	Shows nonverbal enthusiasm.
52	Participates quietly with group on task.
53	Withdraws from group and works alone.
54	Does not work on the project whether alone or with group; watches others, bored, etc.
55	Withdraws for security.
56	Exploring the situation, e.g., gets distracted by microphone, camera, lights, etc.
Response to Peer	
61	A non-antagonistic verbal response to a non-antagonistic peer statement/action.
71	A non-antagonistic nonverbal response to a non-antagonistic peer statement/action (listening).
62	A non-antagonistic verbal response to an antagonistic peer statement/action.
72	A non-antagonistic nonverbal response to an antagonistic peer statement/action.
63	An antagonistic verbal response to an antagonistic peer statement/action.
73	An antagonistic nonverbal response to an antagonistic peer statement/action.
64	An antagonistic verbal response to a non-antagonistic peer statement/action.
74	An antagonistic nonverbal response to a non-antagonistic peer statement/action.

Sampling and Experimental Design

The original sample consisted of 108 3-, 4-, and 5-year-olds subjects randomly drawn from the TV only, TV-HV, and TV-HV-MC groups. Due to absences, only 88 subjects were observed. Table 18.2 shows the effective sampling scheme in a treatment x age x sex classification.

The subjects then were grouped for videotaping in such a way that the following conditions were met:

- Each task group consisted of four children except when a member withdrew and could not be replaced. In that event, the group still was used as long as at least two members were present.
- Members of each group were strangers to one another in order to eliminate variance resulting from different degrees of friendship.
- The members of a particular group were boys and girls of the same age.

Table 18.2

Effective Sampling Scheme for 88 Participants in the Social Skills Evaluation

(A) Treatment	(B) Age	(C) Sex Male	Female	Both Sexes
TV-HV-MC	3	4	5	9
	4	6	6	12
	5	6	4	10
TV-HV	3	4	4	8
	4	4	3	7
	5	5	6	11
TV only	3	5	6	11
	4	5	4	9
	5	6	5	11
All Treatments	All Ages	45	43	88

Note: The ANOVA model for this 3 x 3 x 2 design is $X_{ijkl} = \mu + A_i + B_j + C_k + (AB)_{ij} + (AC)_{ik} + (BC)_{jk} + (ABC)_{ijk} + e_{ijkl}$

In the analysis, the unit of observation was the child who was classified in one of the 18 cells in the sampling design (Table 18.2).

Each task group was mixed (boys and girls) within each treatment-age group. Thus, the number 12 in the last column, second row of Table 18.2, refers to three, four-member task groups, each consisting of two boys and two girls. The task groups were for videotaping purposes and had nothing to do with grouping for analysis of variance. In the design the boys and girls were separated for the two levels of Factor C (sex).

Originally it was intended to have a fixed number of task groups within each treatment-age classification. The purpose was to remove the variance due to group effect in the analysis of variance. The absences, however, reduced the number of task groups in some treatment-age classifications. Hence, a three-factor unbalanced design was employed. There were two to three task groups for each treatment-age cell with the exception of one cell which had only one task group.

Coding

A trained observer/coder coded the videotapes according to the 27 categories in Table 18.1. Each category was recorded by using two-digit codes. The procedure for coding follows.

Approximately every three seconds the coder who was observing the videotape key punched the numerals corresponding to the category that best described the activities of the previous three seconds. This process continued for the length of time the session lasted. The cards on which the categories were punched served as data cards for computer analysis.[1]

When an error was made in key punching, the coder stopped the videotape, rewound it to the desired part, corrected the error on the key punch, and continued to code. Each tape was seen three or four times since the coding was done for each individual child.

There was no need for reliability tests between two or more observers because the categories were well defined and ground rules had been firmly established during the training and practice sessions.

Analysis

The videotapes lasted approximately twenty minutes each. Coding 88 children at three-second intervals produced a total of 37,651 tallies, or an average of 427 per child.

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[1]The data were processed at the University of Michigan Computing Center.

Relative Frequencies on Six Categories

Relative frequency refers to the number of tallies on a specific category per 1,000 tallies. The categories to be compared in this section on the basis of treatment group, age, and sex are:

11 Initiates constructive or neutral statement.

51 Shows nonverbal enthusiasm.

52 Participates quietly with group on task.

54 Does not work on the project whether alone or with group; watches others, bored.

61 A non-antagonistic verbal response to a non-antagonistic peer statement/action.

71 A non-antagonistic nonverbal response to a non-antagonistic peer statement/action.

The relative frequencies for these six categories are shown in Tables 18.3, 18.4, and 18.5. Table 18.3 shows the mean frequency of occurrence of each category per 1,000 tallies for the three treatment groups taken across age and sex. Table 18.4 shows the relative frequencies broken down by age groups, and Table 18.5 shows the relative frequencies broken down by age and sex.

Table 18.3

Mean Frequency Per 1,000 Tallies on Six Categories of Social Skills by Treatment

Treatment Group	Category 11 In. Con. St.	51 NV. Enth.	52 Quiet Part.	54 Stops Work.	61 NA-V/NA	71 NA-NV/NA
TV-HV-MC (N=31)	61	8	740	154	3	34
TV-HV (N=26)	56	4	738	80	7	39
TV only (N=31)	28	3	687	216	1	11

Table 18.4

Observed Frequency Per 1,000 Tallies on Six Categories of Social Skills by Treatment Group and Age

Treatment Group	Age (n)	Category 11 In. Con. St.	51 NV. Enth.	52 Quiet Part.	54 Stops Work.	61 NA-V/NA	71 NA-NV/NA
TV-HV-MC	3 (9)	59	2	739	155	1	31
	4 (12)	79	19	698	123	6	49
	5 (10)	43	3	816	192	2	20
TV-HV	3 (8)	42	6	670	66	3	31
	4 (7)	91	3	650	127	18	72
	5 (11)	44	3	844	60	2	23
TV only	3 (11)	25	1	737	122	0	10
	4 (9)	30	1	674	235	2	14
	5 (11)	30	6	649	295	0	11

Table 18.5

Frequency Per 1,000 Tallies on Six Categories of Social Skills, by Category, Treatment Group, Age, and Sex

Treatment Group	Age	Sex (n)	Category 11 In. Con. St.	51 NV. Enth.	52 Quiet Part.	54 Stops Work.	61 NA-V/NA	71 NA-NV/NA
TV-HV-MC	3	M (4)	46	2	833	71	1	34
		F (5)	69	2	654	222	2	26
	4	M (6)	130	21	706	60	8	44
		F (6)	29	18	689	187	3	54
	5	M (6)	72	5	937	92	4	22
		F (4)	0	0	635	343	0	17
TV-HV	3	M (4)	79	4	761	44	5	39
		F (4)	4	7	578	89	1	24
	4	M (4)	165	5	651	19	32	68
		F (3)	0	1	648	271	0	76
	5	M (5)	90	3	844	21	4	18
		F (6)	2	4	846	92	1	28
TV only	3	M (5)	11	3	791	86	0	14
		F (6)	35	0	691	152	0	6
	4	M (5)	41	0	738	199	2	15
		F (4)	17	1	593	280	2	11
	5	M (6)	65	11	550	426	0	20
		F (5)	0	0	769	223	0	1

The greater relative frequency of initiating constructive statements (category 11) by the TV-HV-MC group (Table 18.3) seems to be accounted for by 4-year-old subjects (Table 18.4). This is consistent with last year's findings. In Table 18.5, it is seen easily that the boys in this age group accounted for the difference. It is possible that the greater tendency of the boys to initiate constructive statements was due to the nature of the task. However, while initiating constructive statements accounted for 13 and 17 percent respectively of the TV-HV-MC and TV-HV boys' tallies, this category accounted for only four percent of the tallies for TV only boys (Table 18.5).

There was more quiet participation (category 52) by the TV-HV-MC and TV-HV groups (each 74 percent) than the TV only (69 percent). (See Table 18.3.) Following up this difference in Table 18.4 shows that the 5-year-olds in the TV-HV-MC and TV-HV groups accounted for the greater frequencies of tallies in these categories. However, for the TV only group, there was more quiet participation by the 3-year-olds.

Except for the 5-year-old TV only group, the boys spent more time participating quietly with the group (Table 18.5). Table 18.3 shows that the TV-HV stopped working fewer times than the other two groups.

In Table 18.5 it is seen that the girls tended to stop working or get bored more often than the boys. The exception was the 5-year-old TV only group. This again suggests that the task may have been more interesting to boys than to girls.

Table 18.4 shows that 4-year-olds in TV-HV had more verbal and non-verbal positive responses (categories 61 and 71), followed by the 4-year-old TV-HV-MC group. The least responsive was the TV only group. The table also shows that, generally, the males responded more.

Observed vs. Expected Frequencies

Table 18.6 compares behavior among the three groups. For each category, the table shows the number of tallies expected from each group and the corresponding number of tallies observed. The calculation of expected values is explained in a footnote to Table 18.6. The differences between these two frequencies were in favor of the TV-HV-MC group in most cases, and of the TV-HV group in fewer cases. Figure 18.1 shows these differences. Figure 18.1 was derived from Table 18.6.

No statistical test of significance was made since the large number of tallies would result in extremely large chi squares; statistical significance would then be a foregone conclusion. Judgement was made on what seemed to be educationally important.

The TV-HV-MC group had more constructive initiating statements than would be expected; the TV-HV had about the same number; the TV only had fewer constructive initiating statements (Figure 18.1a).

The TV-HV-MC group showed most enthusiasm (Figure 18.1b), had the least inclination to withdraw either to work alone (Figure 18.1c) or for security (Figure 18.1e), were least likely to be distracted (Figure 18.1f). The TV-HV group was least inclined to stop working (Figure 18.1d) but most likely to be distracted (Figure 18.1f). Withdrawing, either to work alone (Figure 18.1c) or for security (Figure 18.1e) characterized the TV only group to a greater extent than either of the other groups.

The categories discriminated well among the three groups in spite of the fact that some categories had few tallies. Following are other contrasts.

The TV only group met antagonism with antagonism (Figure 18.1i). The TV-HV-MC and TV-HV were low on this type of response. The non-antagonistic response to a non-antagonistic behavior of peer was low for the TV only and high for the TV-HV and TV-HV-MC groups (Figure 18.1g, h). The TV only group not only responded with antagonism more than expected but also initiated antagonistic action (Figure 18.1j). The TV-HV appeared much more helpful than the TV-HV-MC group (Figure 18.1m), while the TV only group did not help any more (or less) than expected.

It should be noted that in some of these comparisons the number of tallies were relatively small. The importance of the findings lies in the generally consistent results favoring the TV-HV-MC or TV-HV against the TV only. Furthermore, while a behavior such as "withdraws for security" received on the order of a few hundred tallies (Figure 18.1e), the range of from 10 to 28 tallies for nonverbal antagonistic response to an antagonistic peer behavior (Figure 18.1i) is worth looking at since it takes but a fraction of a second for this behavior to occur and be noted.

Table 18.6

Expecte and Observed Frequencies of Tallies by APEP Treatment Group and by Social Skills Category

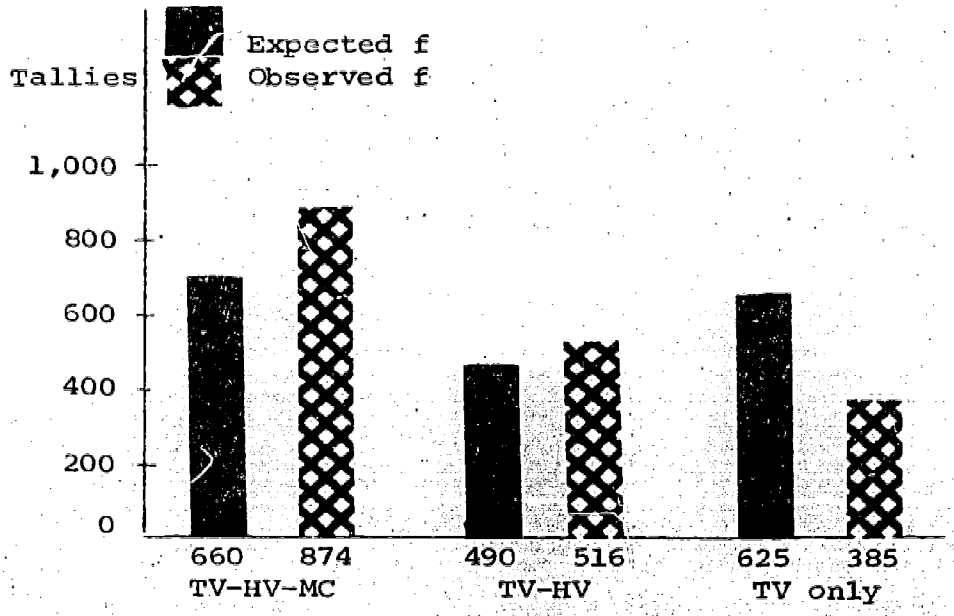
Categories	Composite Tallies (All Treatment Groups)	Package		TV-HV		TV only	
		Exp. F	Obs. F	Exp. F	Obs. F	Exp. F	Obs. F
INITIATION[2]							
11 Constructive statement	1,775	660	874	490	516	625	385
12 Constructive action	22	8	7	6	15	8	0
13 Antag. statement	20	7	5	6	7	7	8
14 Antag. action	83	31	24	23	19	29	40
QUEST. OR REQ. FOR HELP							
21 Questions peer	49	18	22	14	13	17	14
22 Req. asst. (verbal)	12	5	5	3	4	4	3
23 Req. asst. (nonverbal)	0	0	0	0	0	0	0
24 Questions teacher	106	40	35	29	35	37	36
25 Listens to teacher	37	14	15	10	17	13	5
GIVING HELP							
31 Needed	40	14	6	12	19	14	15
32 Not needed	4		0		3		1
REFUSING HELP							
41 With good reason	2	0.74	0	0.55	2	0.10	0
42 Without good reason	3	1.12	0	0.83	2	1.05	1
GROUP CONSCIOUSNESS							
51 Enthusiasm	194	72	114	54	41	68	39
52 Quiet participation	26,822	9,977	10,098	7,403	7,826	9,442	8,898
53 Withdraws to work alone	300	112	28	83	64	105	208
54 Stops working	5,351	1,991	2,154	1,477	771	1,883	2,426
55 Withdraws for security	1,343	499	0	371	496	473	847
56 Gets distracted	330	123	45	91	164	116	121
RESPONSE TO PEER							
61 NA-V/NA	106	40	46	29	50	37	10
71 NA-NV/NA	979	364	489	270	320	345	170
62 NA-V/A	1		0		1		0
72 NA-NV/A	12	5	7	3	4	4	1
63 A-V/A	14	5	1	4	7	5	6
73 A-NV/A	40	14	10	12	2	14	28
64 A-V	2		0		2		0
74 NV/NA	4		0		2		2
Total	37,651		13,985		10,402		13,264
	(1.000)		(.372)		(.276)		(.352)

Table 18.6 (Continued)

[1]Expected frequencies were calculated for each category by multiplying the average proportion of tallies, 0.372 (=13,985/37,651) in the TV-HV-MC group, 0.276 (=10,402/37,651) in the TV-HV group, and 0.352 (=13,264/37,651) in the TV only group.

[2]NA = non-antagonistic A = antagonistic
V = verbal NV = nonverbal

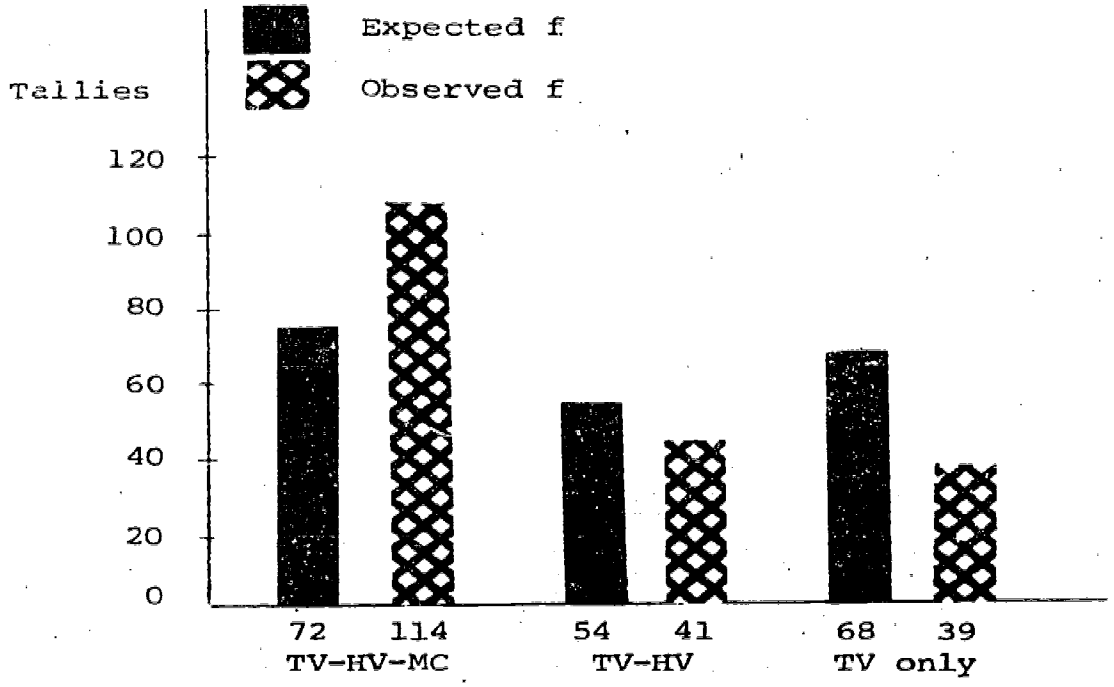
The symbol at the left of the slash sign is the response, and that on the right is peer behavior.



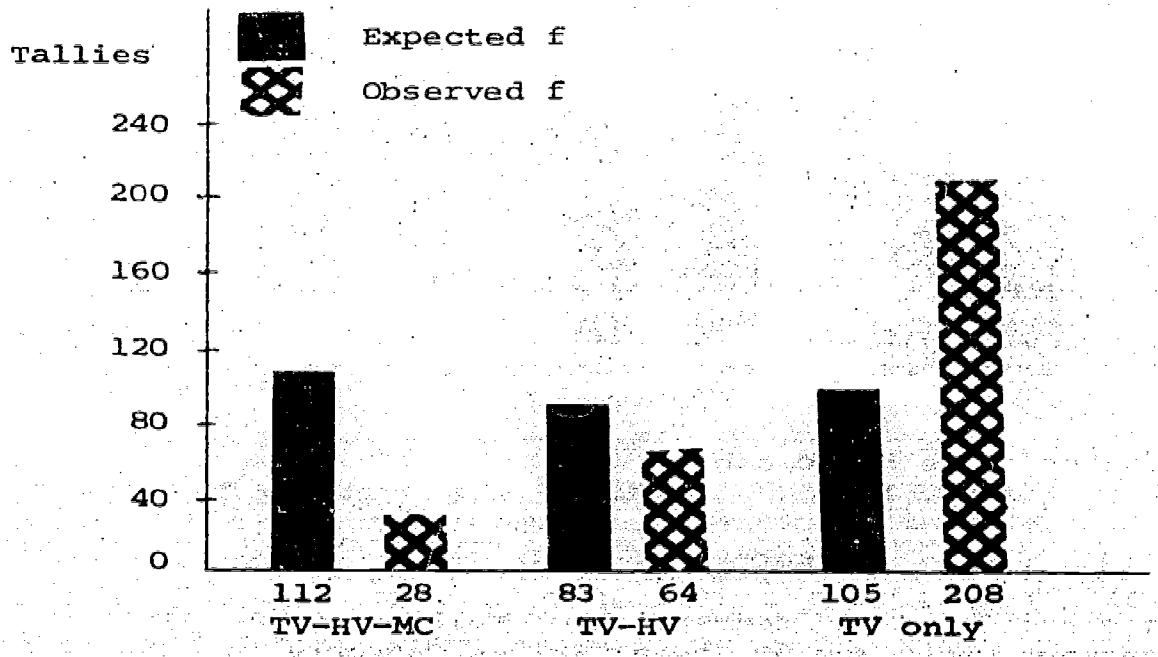
a. Constructive Statement (Cat. 11)

Figure 18.1

Expected and Observed Frequencies of Tallies by Treatment Group and by Social Skills Category

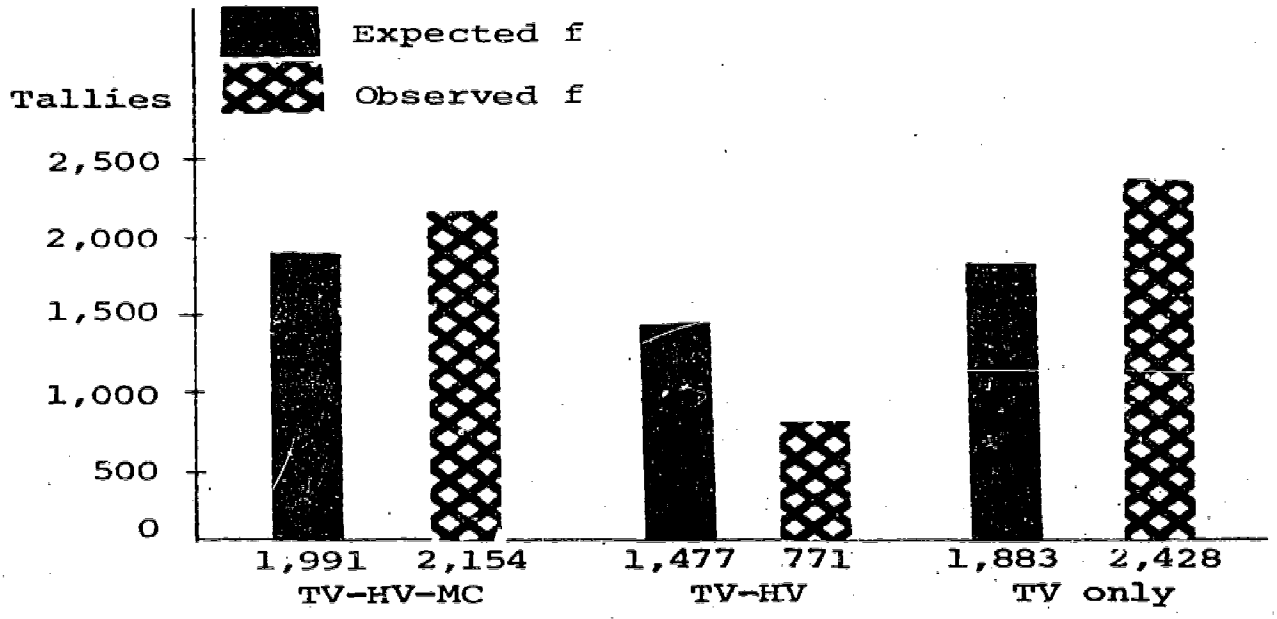


b. Enthusiasm
(Cat. 51)

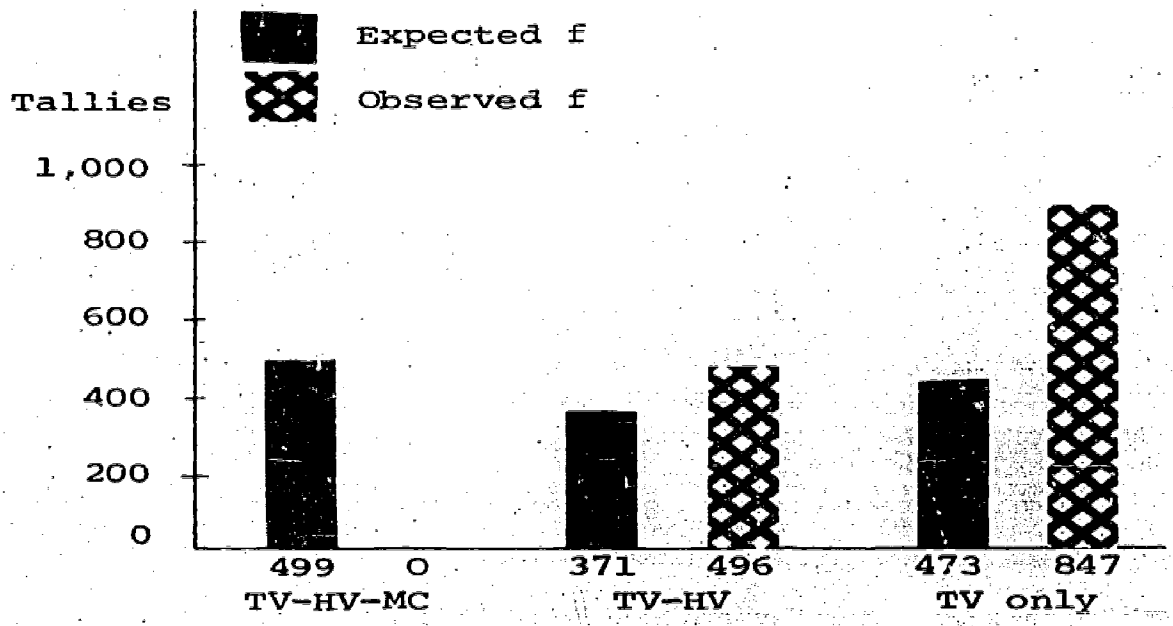


c. Withdraws to work alone
(Cat. 53)

Figure 18.1 (Continued)

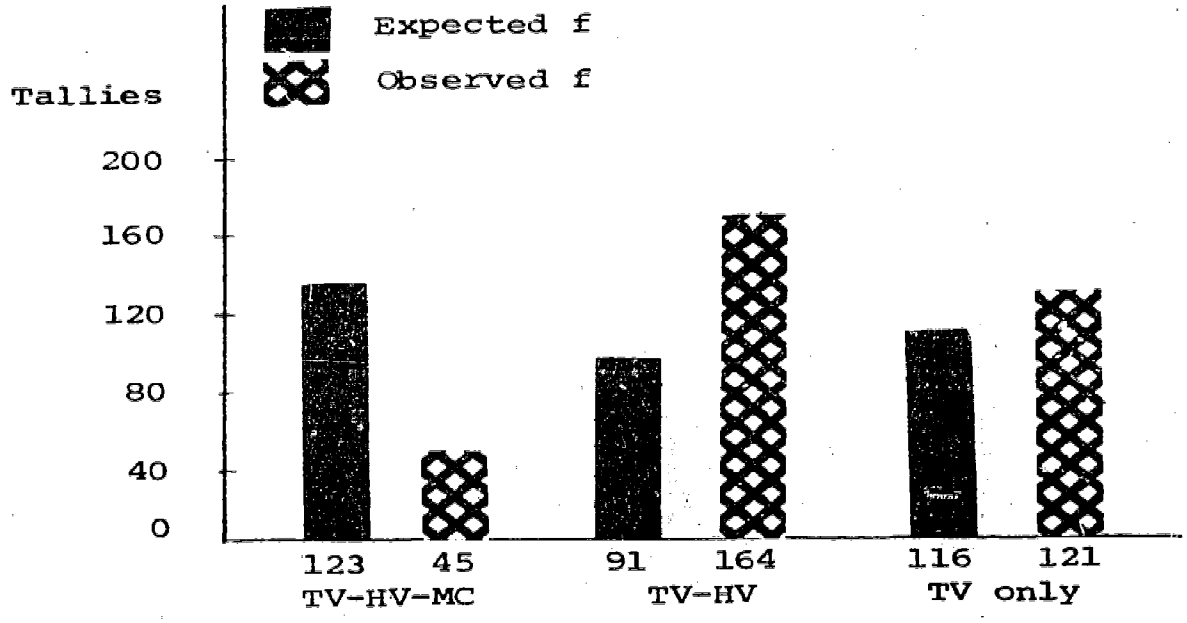


d. Stops Working
(Cat. 54)

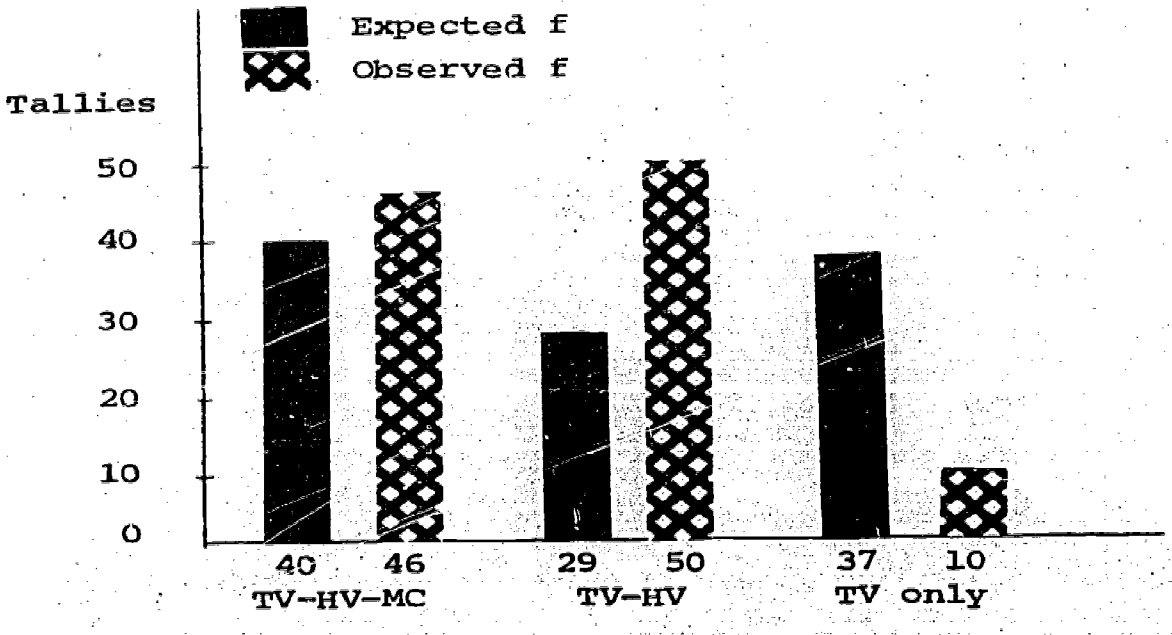


e. Withdraws for Security
(Cat. 55)

Figure 18.1 (Continued)



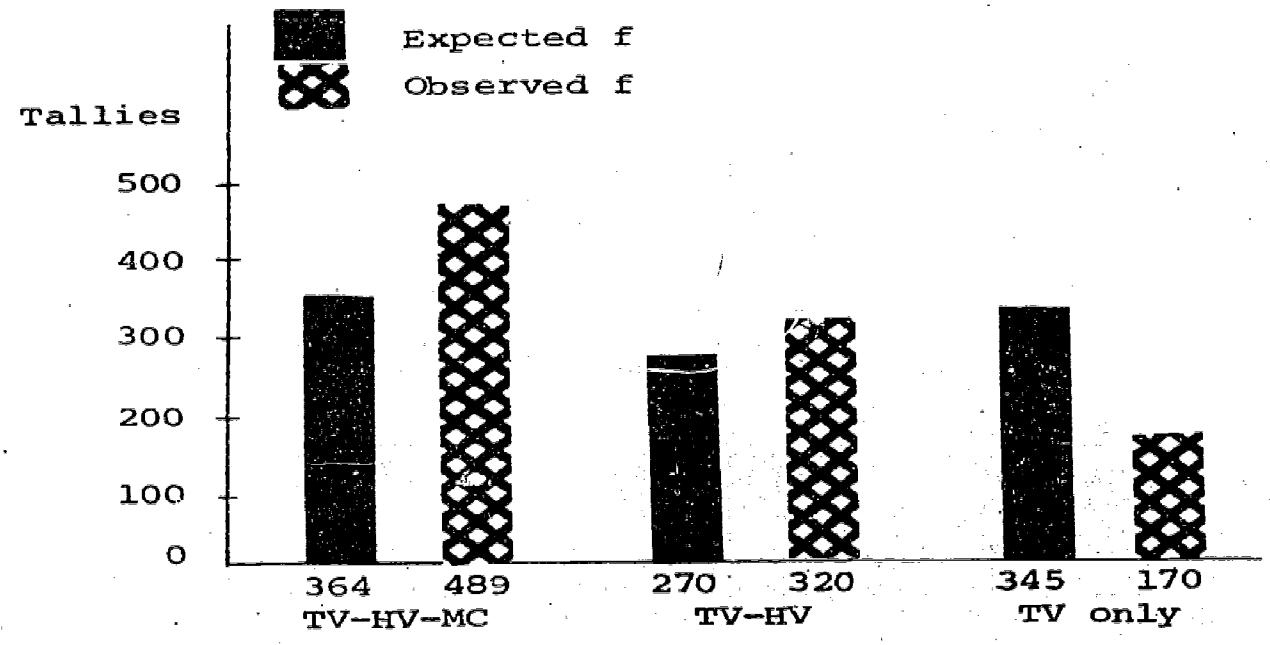
f. Gets Distracted
(Cat. 56)



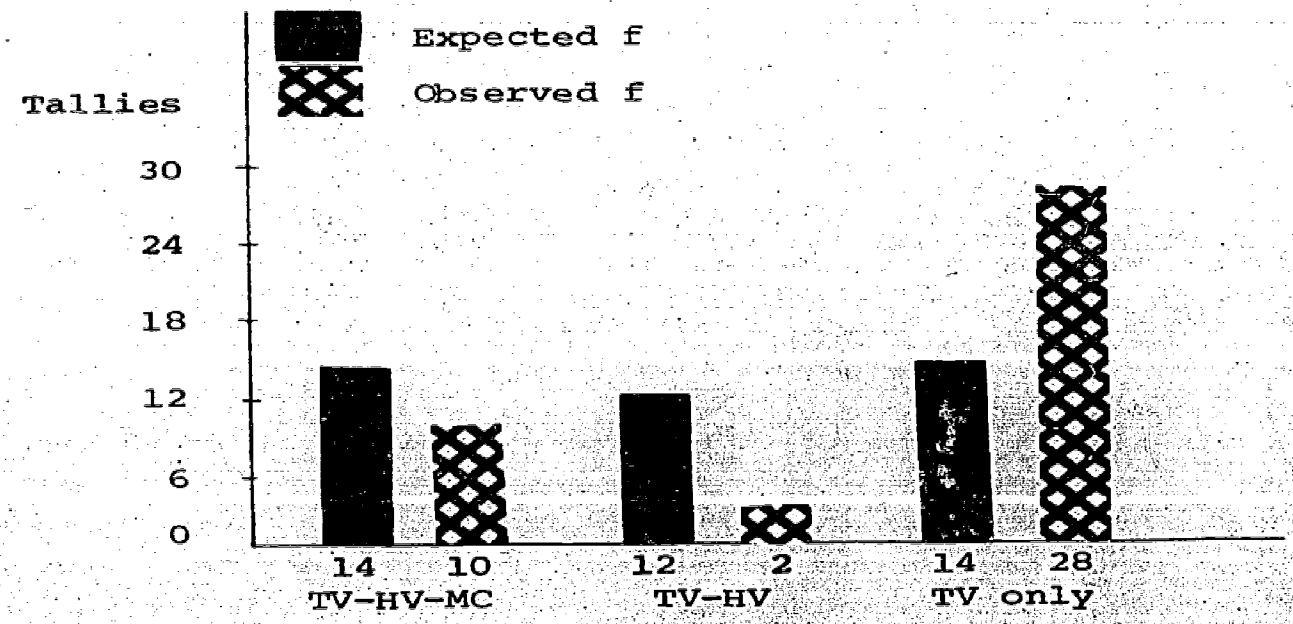
g. NA - V/NA *
(Cat. 61)

Figure 18.1 (Continued)

*See footnote No. 2 of Table 18.6.



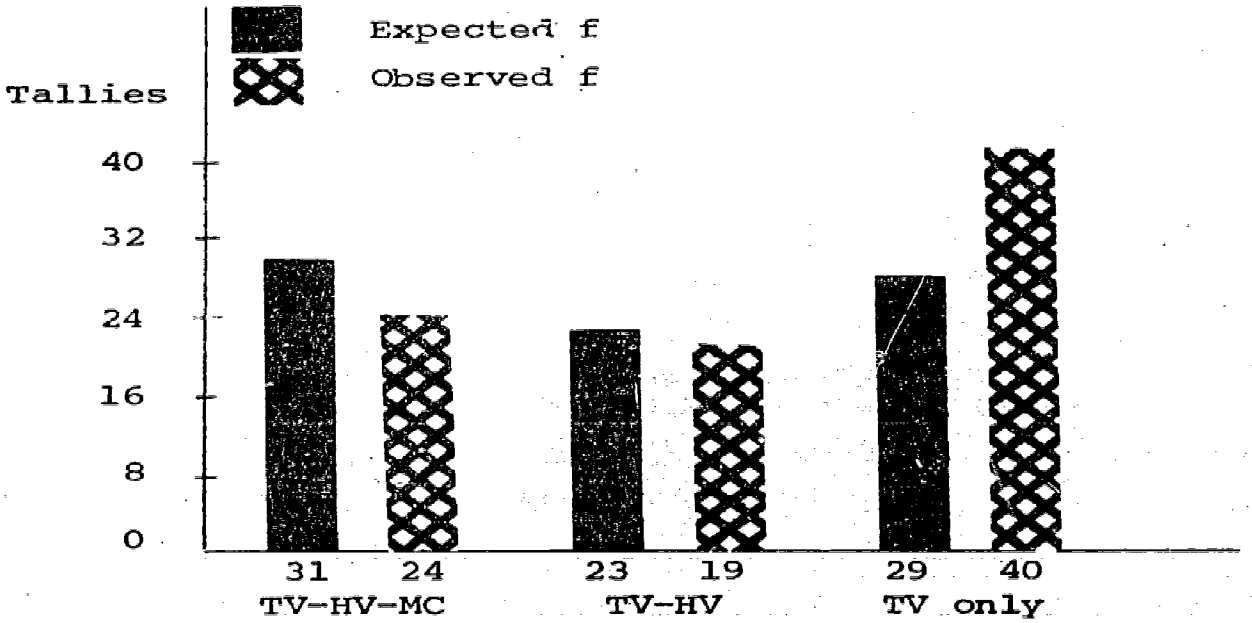
h. NA - NV/NA*
(Cat. 71)



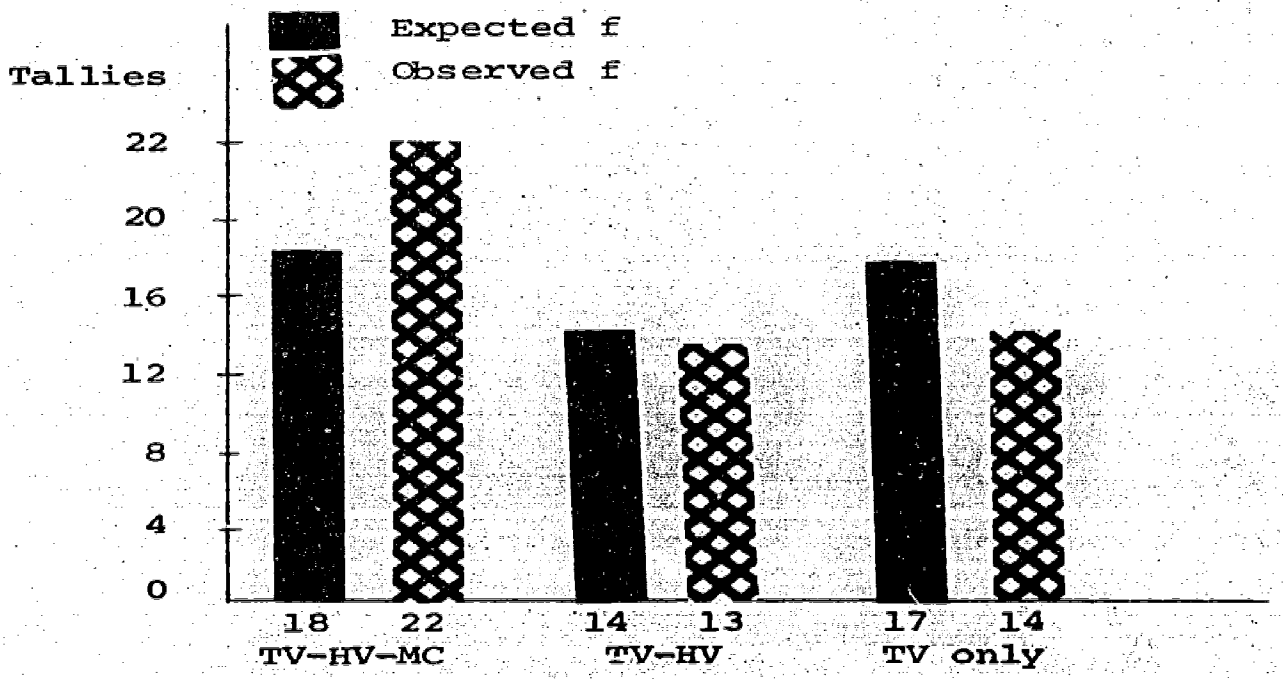
i. A - NV/A*
(Cat. 73)

Figure 18.1 (Continued)

*See footnote 2, Table 18.6.

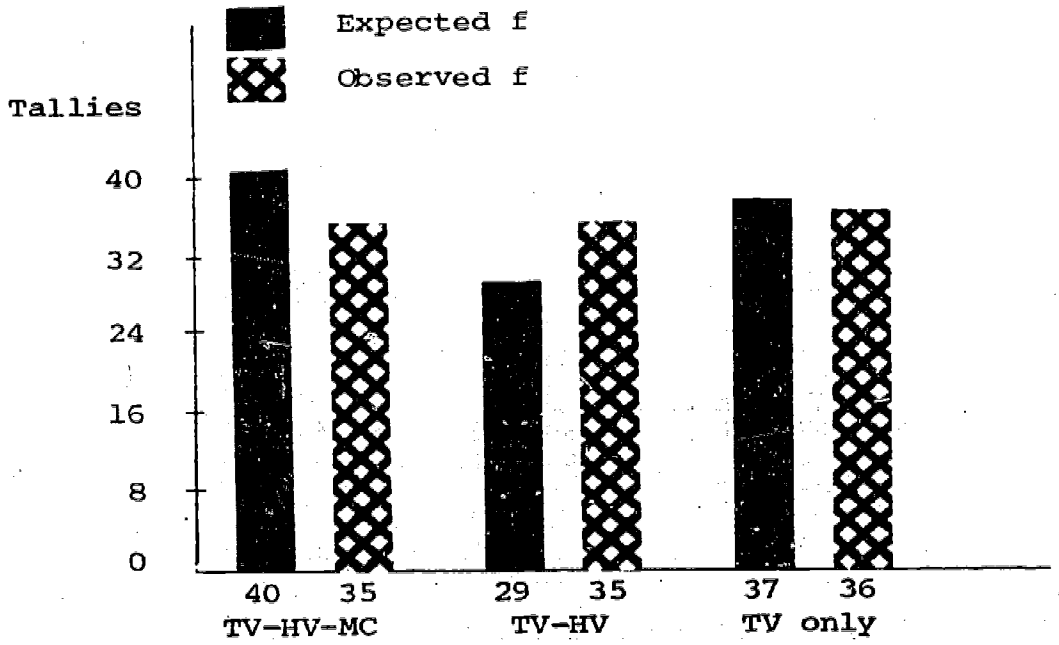


j. Antagonistic Action (init.)
(Cat. 14)

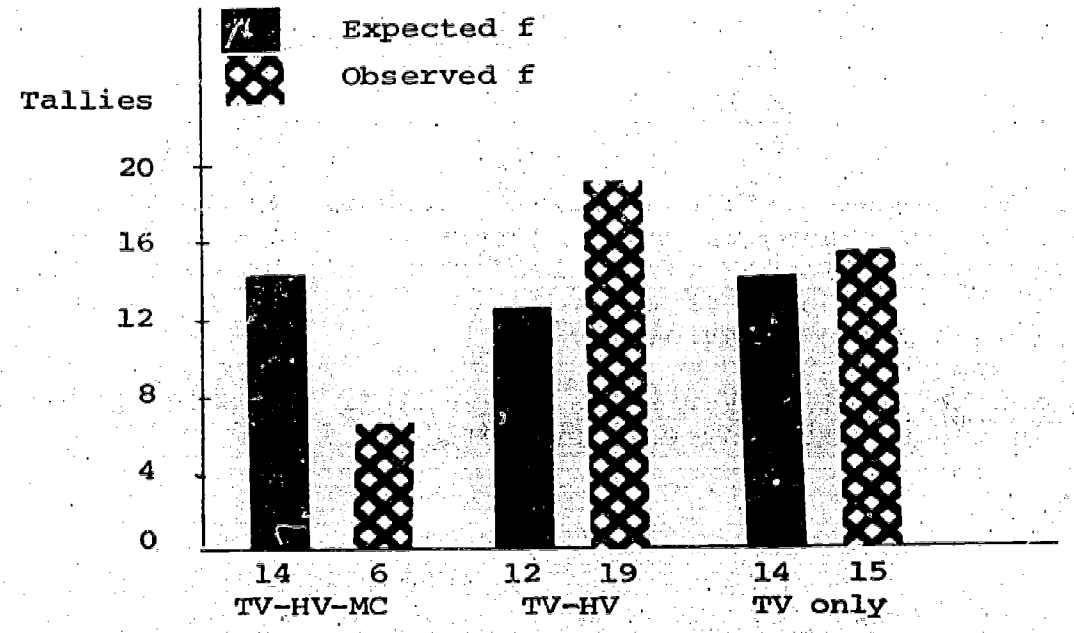


k. Questions Peer
(Cat. 21)

Figure 18.1 (Continued)



1. Questions Teacher
(Cat. 24)



m. Gives help when needed
(Cat. 31)

Figure 18.1 (Continued)

Variables Derived from the Categories

It was hypothesized that groups of preschool children will differ in such variables as verbalization, group participation, exploration, need for security, and antagonistic activities.

A behavior also may be categorized as facilitating or nonfacilitating for the accomplishment of a task. With these theoretical concepts in mind, 13 variables were operationally defined with the use of the original 27 categories.

Verbalization, Exploration, Need for Security. The operational definitions of three variables derived from the 27 categories follow. The number within parentheses is the category code, and the commas indicate addition of the frequencies in those categories.

Verbalization. Proportion of time spent talking (Variable 1).

$$\frac{(11), (13), (15), (21), (22), (24), (61), (62), (63), (64)}{\text{Total Tallies}}$$

Exploration. Proportion of time exploring the situation, e.g., gets distracted by microphone, camera, lights, etc. (Variable 2).

$$\frac{(56)}{\text{Total Tallies}}$$

Need for Security. Proportion of time seeking security (Variable 3).

$$\frac{(24), (25), (55)}{\text{Total Tallies}}$$

As input data for the computer, these variables were expressed as frequencies per 1,000 tallies. They are reported here in terms of percentages which represent the "proportion of total time" spent in the particular behavior or (which is the same) the proportion of the participant's total number of tallies spent in a given behavior.

Facilitating and Nonfacilitating Variables. Ten other variables refer to the ten categories in the new ten-category system shown in Table 18.7. These are variables 4 to 13.

Table 18.7

Reduction of the 28 Categories to 10 Categories

New Category Numbers	Original Categories Combined	General Category Names
Nonfacilitating:		
1	55, 56	Withdraws for security; gets distracted
2	13, 14	Initiates antagnoistic behavior
3	41, 42	Refuses help
4	63, 73, 64, 74	Responds with antagonism
5	53, 54	Works alone or stops working
Facilitating:		
6	51, 52	Participates quietly with group; nonverbal enthusiasm
7	11, 12	Initiates constructive behavior
8	21, 22, 23, 24	Asks questions or requests help
9	61, 71, 62, 72, 25	Responds positively or without antagonism
10	31, 32	Gives help

The table shows how the original 27 categories were reduced to ten, such that the first five were nonfacilitating and the last five were facilitating.

Analysis of the Derived Variables

Analysis of Variance. A three-factor analysis of variance with unequal N's in each cell was computed on the data for 88 subjects. The analysis of variance tables for the 13 variables defined in the previous sections are found in Attachment 18.1, Tables 1 through 13.

Significant main effects and interactions shown in Attachment 18.1 are summarized in Table 18.8.

Table 18.8

Summary of Levels of Significance ($p \geq .10$) in the Analyses of Variance of 13 Social Skills Variables

Variable		Source of Variation	p<
1	Talking	Sex	.01
2	Exploring situation	Age	.01
3	Need for security	Age-Sex	.10
5	Init. antag. behavior	Age	.10
7	Resp. w/antagonism	Treatment-Age	.10
8	Working alone/leaving work	Sex	.01
10	Init. constructive behavior	Sex	.01
11	Asking ques./requesting help	Treatment-Sex	.01
11	Asking ques./requesting help	Age-Sex	.10
12	Responding constructively	Treatment	.01
12	Responding constructively	Age	.01
12	Responding constructively	Treatment-Age	.05
13	Giving help	Age	.10
13	Giving help	Sex	.10

Attachment 18.2 gives the means for the 13 variables by treatment, age, and sex. The information in this attachment was used to note in what way groups differed on those variables with significant results.

Treatment Effects. While no significant treatment effect was seen in the 1970 study, responding constructively was one variable that produced significant treatment effect in 1971. The additional treatment level in 1971 (TV only) apparently made the difference.

An application of Duncan's multiple range test for unequal replications (see Attachment 18.2) gives the following results (the numbers represent frequencies per thousand tallies) on the variable, responding constructively.

TV only	TV-HV-MC	TV-HV
17.7	37.5	47.7

Any two means not connected by a line differ significantly from one another.

(22)

The TV-HV and TV-HV-MC groups did not differ significantly in responding constructively but each had a significantly higher proportion of tallies on responding constructively than did the TV only. No other variables had significant treatment effects.

Age and Sex Effects. Duncan's new multiple range test for paired comparisons was applied on those variables with age and sex effects significant at the .05 level (or lower). The least significant range (LSR) which determine the significance of difference between two means are found in Attachment 18.1 following the ANOVA tables.

The following is a list of those variables with significant F ratios on age, showing the results of Duncan's test:

Exploring situation: (see Attachment 18.2)	Age:	5	4	3
	Means:	0.0	12.3	23.7
Responding constructively:	Age:	3	5	4
	Means:	23.8	24.1	54.7

Exploring the situation implied distraction; attention was not on the task. The 5-year-olds were not distracted at all. The 3- and 4-year-olds had 23.7 and 12.3 tallies per thousand respectively in "exploring the situation"; the two means, while not significantly different from one other, differed significantly from the mean for 5-year-olds who had zero tallies in this category. The nature of the task might possibly explain the difference--namely that the older child enjoyed the task more.

The 4-year-olds responded constructively significantly more often than the 3- and 5-year-olds.

Since there were only two means to be compared on the sex factor, there was no need for Duncan's test. The number of tallies per thousand on those variables with significant differences between boys and girls at the .05 level or lower is given:

Variable	Male	Female
Talking	89.5	23.3
Working alone/leaving work	90.5	215.0
Initiating constructive behavior	77.1	18.3

The differences between boys and girls on the three variables were all in favor of the boys. Boys talked more often, initiated more constructive behavior, and on the average stayed with the tasks longer than girls. The differences on age and sex apparently were due to the nature of the task.

Interaction. Interactions significant at .05 or lower are treatment-sex on asking questions or requesting help and treatment-age on responding contructively.

Figure 18.2 shows a difference in direction of response to treatment by sex. Among boys, those in the TV-HV group asked the most questions or requested most help; among the girls, those in the TV-HV group had the fewest questions and requests for help.

Figure 18.3 also shows a difference in direction of response to treatment by age. Among the 3-year-olds, the TV-HV-MC is most effective in eliciting constructive response. The TV only has low constructive response ratio on all age groups. The highest response is from the TV-HV 4-year-olds.

Comparison of 1970 and 1971 on the 13 Variables

The results of the ANOVA in 1971 will be discussed with occasional comparison with results on the same variables in the 1970 study. The differences between these two periods in task, factors and sample size were discussed earlier in this report, but as a guide to the comparative analysis, these differences are summarized in Table 18.9.

Table 18.9

Points of Differences between 1970 and 1971 Social Skills Study

Task	1970 Placing model furniture in a model house	1971 Manipulating controls of battery operated train
ANOVA factors:		
A	Treatment: TV-HV-MC, TV-HV	Treatment: TV-HV-MC, TV-HV, TV only
B	Age: 3, 4, 5	Age: 3, 4, 5
C	Sex grouping: all male, all female, mixed group	Sex of child: male, female
Sample size	105	88

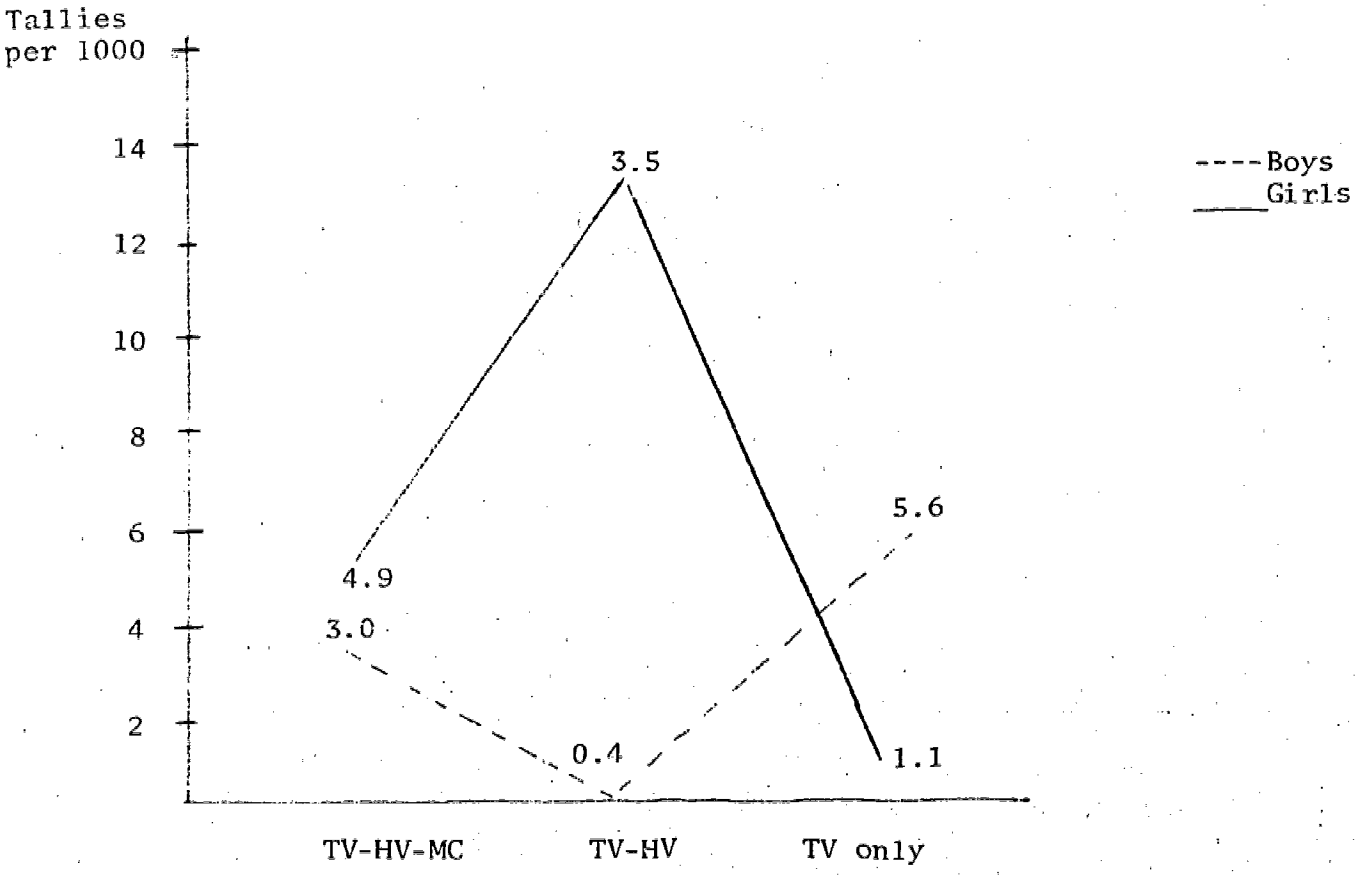


Figure 18.2

Treatment-Sex Interaction on Asking Questions Requesting Help

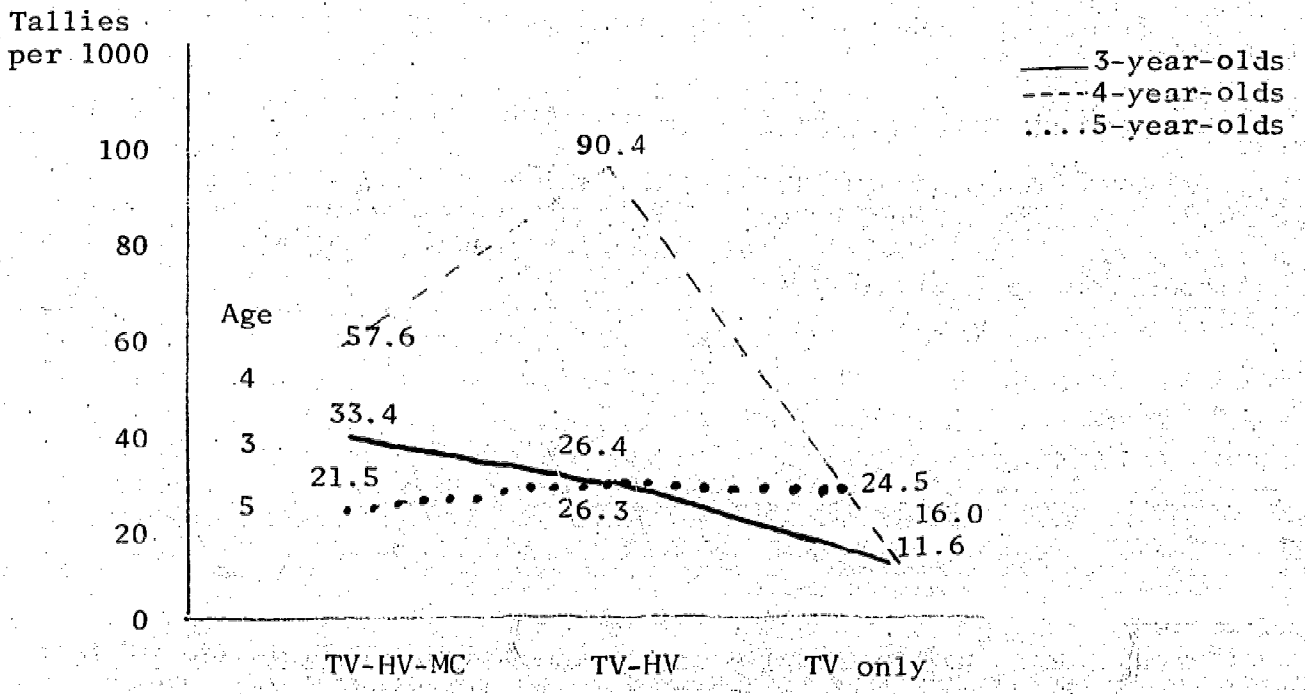


Figure 18.3

Treatment-Age Interaction on Responding Constructively (25)

The factors are not all identical but they are comparable. For instance, in some results it is seen that while sex grouping failed to make a difference in one variable in 1970 the sex of the child did make a difference on the same variable in 1971. It may be that the change in task explains this finding or that the method of sex grouping used in 1970 masked sex differences on the variable.

A summary of the 1970 and 1971 findings is shown in Table 18.10. As with last year's analysis, statistical significance is noted at levels 0.10, 0.05, 0.025, and 0.01. Considering the nature of the data, the need for a more appropriate task, and the direction and consistency of differences, 0.10 was considered significant in this study.

The 13 variables discussed in the previous section are listed in Table 18.10. It is interesting to note that all the 13 variables attained significance at p=.10 or lower in a given factor or interaction either in 1970 or 1971. Ten of the 13 variables had significance at .05 or lower. Initiating antagonistic behavior, refusing help, and giving help were the three variables with significance only at p=.10.

It will be noted that some variables were consistently significant in both studies, while others switch from significance to nonsignificance or vice versa.

In 1970, treatment effects (A factor) were significant at .10 for the variables exploring the situation, need for security, withdrawing/distraction[2] and initiating constructive behavior. However, these variables failed to distinguish between treatment in the 1971 study. A possible reason was the large proportion of the time spent in quiet participation on the task this year. Exploring the situation showed a significant difference between ages in both 1970 ($p<.10$) and 1971 ($p<.01$). There was a significant difference between treatment groups on responding constructively in 1971 ($p<.01$) but none in 1970.

Responding constructively to peer had highly constrasting results in 1970 and 1971. There was no treatment effect in 1970. In 1971 the three groups differed at the .01 level with percent of time as follows: TV-HV-MC 3.75, TV-HV 4.77, and TV only 1.77. Other comparisons not discussed here had to do with the age and sex factors and interactions. These can be identified in Table 18.10.

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[2]There is a slight overlap in the operational definitions of the variables "exploring the situation" and "withdrawing/distraction."

Table 18.10

F Rations and Levels of Significance from ANOVA of Social Skills Variables in 1970 and 1971

Variable	Source of Variation[2]													
	A		B		C		AB		AC		BC		ABC	
	1970	1971	1970	1971	1970	1971	1970	1971	1970	1971	1970	1971	1970	1971
Talking	1.60	1.27	0.57	0.95	0.84	8.48	0.79	0.24	0.64	2.03	2.50*	1.99	0.16	0.38
Exploring Situation	3.41[a]	1.06	2.35[a]	6.11***	0.56	1.47	1.05	1.29	0.59	0.68	1.14	1.99	1.27	0.60
Need for Security	3.49[a]	0.82	5.81***	1.16	1.97	0.61	1.18	0.61	2.15	0.51	2.44[a]	2.41[a]	1.28	0.71
Withdr./Distraction	2.84[a]	1.06	6.16***	2.04	2.99[a]	0.35	0.81	0.85	2.46[a]	0.41	2.15	1.81	0.92	0.55
Init. Antag. Beh.	1.50	0.36	1.80	2.64[a]	0.31	0.44	0.74	1.57	0.81	0.17	1.15	0.33	1.21	0.48
Refusing Help	0.18	1.90	1.67	0.90	0.49	0.38	0.19	0.50	1.23	0.11	0.53	0.50	1.23	0.89
Resp. W/Antag.	1.72	0.85	0.68	0.85	1.29	0.54	2.85[a]	2.14[a]	1.18	0.05	2.48*	0.05	3.52***	0.28
Work. Alone/ Leaving Work	0.04	2.23	1.00	0.48	0.87	8.91***	0.77	0.62	0.79	0.57	0.92	0.12	1.90	0.44
Quiet Participation Nonverbal Enthusiasm	0.46	0.47	3.63*	0.50	1.32	2.37	2.38[a]	0.98	0.15	0.27	0.78	1.98	0.05	0.89
Init. Const. Behavior	3.48[a]	1.29	0.88	0.72	0.21	4.39***	0.69	0.20	0.89	1.78	2.36[a]	1.71	0.55	0.34
Ask. Q./Req. Help	0.30	0.76	3.00	2.02	4.10**	1.98	0.19	1.69	0.59	4.04***	3.77***	2.98[a]	0.50	1.57
Resp. Constructively	0.20	4.59***	2.50[a]	10.78***	0.25	1.02	0.27	2.83*	1.88	0.36	1.79	0.68	0.39	0.54
Giving Help	0.41	0.89	1.83	2.99[a]	1.32	3.01[a]	0.77	0.40	2.33	0.63	1.72	2.23	1.79	1.29

[1] a $p < .10$
* $p < .05$
** $p < .025$
*** $p < .01$

[2]The Sources of Variation in 1970 and 1971 were not identical but comparable. See text.

A--Treatment
B--Age
C--Sex

Summary and Implications

Summary

Social skills development in the Appalachia Preschool Education Program highlights the importance of socialized education in the mobile classroom and the role of paraprofessionals in home visitations. It was seen in most comparisons that television alone could not produce the desired social skills without the integrating and socializing function of the mobile classroom and the home visitors.

The social skills categories analyzed in this study were initiation, question or request for help, giving help/refusing help, group consciousness and response to peer.

Most results were in favor of the children who were visited by paraprofessionals in addition to TV instruction, and those children who in addition to TV instruction and visits by paraprofessionals attended a mobile classroom once a week.

Examples of differences between groups follow. The TV-HV-MC and the TV-HV 4-year-olds had more verbal positive responses than the TV only.

Enthusiasm, constructive statements and asking questions of peer were more characteristic of the TV-HV-MC than of the other two groups. Getting distracted and giving help when needed were more characteristic of the TV-HV. Withdrawing for security or withdrawing to work alone were more characteristic of the TV only. The TV-HV-MC and TV-HV groups had significantly more constructive responses than the TV only group.

There were also sex and age differences. Girls worked alone more than boys, while boys did more talking and initiated more constructive behavior. These differences appear to be explained by the task, which may have interested boys more than girls.

The 3- and 4-year-olds explored the situation around them significantly more than the 5-year-olds. Responding constructively was significantly more characteristic of the 4-year-olds.

Implications

There were three important outcomes of this study:

- It was shown that a task can be created for preschool children which will elicit from them in a natural and spontaneous manner important social skills behaviors.

- It was shown that in order to develop social skills in Appalachian children ages 3, 4, and 5, it is necessary to provide socialization opportunities through contacts with other children and adults outside of the immediate home environment. This fact was evidenced by the differences between the TV-HV-MC and TV-HV groups on the one hand, and the TV only on the other. Differences in such social skills as initiating constructive statements and withdrawing for security favored the TV-HV-MC group, or the TV-HV, or both.

- Social skills in preschool children can be recorded under a systematic observation plan, are measurable, and can be analyzed statistically. Systematic observation and recording of affective behavior may be one answer to the dearth of reliable measures in this area.

Attachment 18.1

ANOVA Tables for Social Skills Data
and Paired Means Comparisons

Analysis of Variance Tables

Variable 1 (Talking)

Source	Sum of Squares	D.F.	Mean Square	F
A	27764.86102	2	13882.43051	1.27
B	20718.56575	2	10359.28287	0.95
C	92701.32529	1	92701.32529	8.48***
AB	10465.59142	4	2616.397856	0.24
AC	44429.14399	2	22214.57200	2.03
BC	43445.88260	2	21722.94130	1.99
ABC	16608.33967	4	4152.084916	0.38
ERROR	765239.0167	70	10931.98595	

Notations: ANOVA Factors
A Treatment (TV-HV-MC, TV-HV, TV only)
B Age (3, 4, 5)
C Sex

Significance:

a P<.10
* P<.05
** P<.025
*** P<.01

These notations will be used throughout all the 13 tables in this attachment.

Variable 2 (Exploring Situation)

Source	Sum of Squares	D.F.	Mean Square	F
A	1657.442439	2	828.7212195	1.06
B	9601.726158	2	4800.863079	6.17***
C	1145.548986	1	1145.548986	1.47
AB	4041.845096	4	1033.711274	1.29
AC	1063.018789	2	531.5093944	0.68
BC	3093.850700	2	1546.925350	1.99
ABC	1855.835600	4	463.9589001	0.60
ERROR	54492.20000	70	778.4600000	

Variable 3 (Need for Security)

Source	Sum of Squares	D.F.	Mean Square	F
A	53911.53450	2	26955.76725	0.82
B	75613.58380	2	37806.79190	1.16
C	20040.35507	1	20040.35507	0.61
AB	79841.93595	4	19960.48399	0.61
AC	33191.61311	2	16595.80656	0.51
BC	157797.1330	2	78898.56651	2.41[a]
ABC	93030.54072	4	23257.63518	0.71
ERROR	2288082.833	70	32686.89762	

(34)

Variable 4 (Withdrawing/Getting Distracted)

Source	Sum of Squares	D.F.	Mean Square	F
A	69957.84803	2	34978.92042	1.06
B	134318.8539	2	67159.42693	2.04
C	11456.91855	1	11456.91855	0.35
AB	112251.5118	4	28062.87795	0.85
AC	26813.03453	2	13406.51727	0.41
BC	118852.5304	2	59426.26518	1.81
ABC	72635.28527	4	18158.82132	0.55
ERROR	2298964.367	70	32842.34810	

Variable 5 (Initiating Antagonistic Behavior)

Source	Sum of Squares	D.F.	Mean Square	F
A	68.03396570	2	34.01698285	0.36
B	496.6403631	2	248.3201816	2.64[a]
C	40.97855072	1	40.97855072	0.44
AB	589.2794332	4	147.3198583	1.57
AC	31.18290511	2	15.59145255	0.17
BC	62.61015144	2	31.30507572	0.33
ABC	180.1227003	4	45.03067507	0.48
ERROR	6585.800000	70	94.08285714	

Variable 6 (Refusing Help)

Source	Sum of Squares	D.F.	Mean Square	F
A	2.132007824	2	1.066003912	1.90
B	1.008582097	2	0.5042910483	0.90
C	0.2113043478	1	0.2113043478	0.38
AB	1.119391375	4	0.2798478436	0.50
AC	0.1243738012	2	0.6218690062	0.11
BC	0.5643145505	2	0.2821572753	0.50
ABC	2.004980704	4	0.5012451760	0.89
ERROR	39.36666667	70	0.5623809524	

Variable 7 (Responding with Antagonism)

Source	Sum of Squares	D.F.	Mean Square	F
A	91.06573235	2	45.53286618	0.85
B	95.07794394	2	47.53897197	0.85
C	29.86695652	1	29.86695652	0.54
AB	476.7993522	4	119.1998380	2.14[a]
AC	6.423790805	2	3.211895402	0.05
BC	8.934087678	2	4.467043839	0.05
ABC	62.70331910	4	15.67582977	0.28
ERROR	3904.400000	70	55.77714286	

Variable 8 (Working Alone/Leaving Work)

Source	Sum of Squares	D.F.	Mean Square	F
A	161164.0310	2	80582.01551	2.23
B	34865.71569	2	17432.85785	0.48
C	321456.0012	1	321456.0012	8.91***
AB	89304.01585	4	22326.00396	0.62
AC	41462.93901	2	20731.46950	0.57
BC	8307.236815	2	4153.618408	0.12
ABC	62835.35101	4	15708.83775	0.44
ERROR	2524789.133	70	36068.41619	

Variable 9 (Quiet Participation/Nonverbal Enthusiasm)

Source	Sum of Squares	D.F.	Mean Square	F
A	45230.24066	2	22615.12033	0.467
B	48542.27271	2	24271.13635	0.501
C	114733.6001	1	114733.6001	2.371
AB	189122.6150	4	47280.65375	0.977
AC	26272.04808	2	13136.02404	0.271
BC	191316.7295	2	95658.36479	1.98
ABC	171756.4825	4	42939.12062	0.887
ERROR	3387930.850	70	48399.01214	

Variable 10 (Initiating Constructive Behavior)

Source	Sum of Squares	D.F.	Mean Square	F
A	20170.62992	2	10085.31496	1.29
B	11175.76573	2	5587.882863	0.72
C	73158.48377	1	73158.48377	9.39***
AB	6152.603399	4	1538.150850	0.20
AC	27689.77949	2	13844.88974	1.78
BC	26619.56558	2	13309.78279	1.71
ABC	10557.99040	4	2639.497599	0.34
ERROR	545502.8000	70	7792.897143	

Variable 11 (Asking Questions/Requesting Help)

Source	Sum of Squares	D.F.	Mean Square	F
A	198.9498120	2	99.47490600	0.762
B	528.1120970	2	264.0560485	2.02
C	258.5739855	1	258.5739855	1.98
AB	883.1627349	4	220.7906837	1.69
AC	1055.796626	2	527.8983132	4.04***
BC	777.1868833	2	388.5934417	2.98[a]
ABC	820.1594967	4	205.0398742	1.57
ERROR	8136.583333	70	130.5226190	

Variable 12 (Responding Constructively)

Source	Sum of Squares	D.F.	Mean Square	F
A	17672.83073	2	8836.415363	9.59***
B	19876.09463	2	9938.047314	10.78***
C	940.1742029	1	940.1742029	1.02
AB	10444.14069	4	2611.0351 2	2.83*
AC	66.80323591	2	33.40161796	0.36
BC	126.4532789	2	63.22663947	0.68
ABC	2007.571704	4	501.8929260	0.54
ERROR	64522.23333	70	921.7461905	

Variable 13 (Giving Help)

Source	Sum of Squares	D.F.	Mean Square	F
A	21.73759092	2	10.86879546	0.89
B	72.68248896	2	36.34124448	2.99[a]
C	36.52898551	1	36.52898551	3.01[a]
AB	19.24133728	4	4.810334319	0.40
AC	17.70783342	2	8.853916709	0.63
BC	54.20545100	2	27.10272550	2.23
ABC	62.83916055	4	15.70979014	1.29
ERROR	849.5666667	70	12.13666667	

Computations for Paired Means Comparisons: Duncan's New Multiple Range Test[1] for Significant Main Effects

1. Variable 12 Responding Constructively, Treatment Effect

	TV only	TV-HV-MC	TV-HV
Means	17.7	37.5	47.7
Replications (r_i)	31	31	26

P	2		3
SSR[1]	2.81		2.93
(r_i, r_j)	(31,31)	(31,26)	(31,26)
LSR	15.34	15.96	16.64

Error d.f. = 70

$S = \sqrt{\text{Mean Square Error}}$
$= \sqrt{922}$
$= 36.36$

P=Number of Means

SSR=Significant Studentized Ranges for 5% Level New Multiple Range Test

$LSR = SSR \times S\sqrt{\frac{1}{2}(\frac{1}{r_i} + \frac{1}{r_j})}$

r_i, r_j=numbers of observation for the two means being compared

[1]Steel, Robert G.D., J. H. Torrie, Principles and Procedures of Statistics, McGraw Hill 1960, pp. 114, 135, 442 (Table A.7, Significant Studentized Ranges).

2. Variable 2 Exploring Situation, Age Effect

	5	4	3
Means	0.0	12.3	23.7
Replications(r_i)	32	28	28

P	2		3
SSR	2.81		2.93
(r_i, r_j)	(28,28)	(28.32)	(28,32)
LSR	16.21	15.34	16.0

(41/42/43

Attachment 18.2

Table I

Means of 13 Social Skills
Variables by Treatment, Age, and Sex Grouping

Variable - Proportion[1] of time spent in:	Treat. Group	Age	Sex		
			Male	Female	Both Sexes
1. Talking	TV-HV-MC	3	4.93	7.44	6.19
		4	14.97	3.67	9.32
		5	7.80	0.05	3.93
	TV-HV	3	9.28	1.75	5.52
		4	21.75	0.00	10.88
		5	10.12	0.87	5.49
	TV only	3	1.64	5.03	3.33
		4	4.34	2.08	3.21
		5	5.72	0.04	2.88
2. Exploring situation (distraction)	TV-HV-MC	3	0.30	0.64	0.47
		4	0.17	0.57	0.37
		5	0.00	0.00	0.00
	TV-HV	3	6.18	1.73	3.96
		4	0.00	0.00	0.00
		5	0.00	0.35	0.18
	TV only	3	4.30	1.03	2.67
		4	0.00	0.00	0.00
		5	0.00	0.00	0.00
3. Showing need for security	TV-HV-MC	3	0.00	0.00	0.00
		4	0.00	0.00	0.00
		5	0.00	0.00	0.00

[1]The proportions are given in percent.

Table I (Continued)

Variable - Proportion of time spent in:	Treat. Group	Age	Sex		
			Male	Female	Both Sexes
	TV-HV	3	0.05	26.65	13.35
		4	0.00	0.00	0.00
		5	0.00	0.00	0.00
	TV only	3	0.00	17.75	8.86
		4	0.00	0.00	0.00
		5	15.63	0.00	7.81
4. Withdrawing/ getting distracted	TV-HV-MC	3	0.30	0.64	0.47
		4	0.17	0.57	0.37
		5	0.13	0.00	0.07
	TV-HV	3	6.23	28.38	17.31
		4	0.00	0.00	0.00
		5	0.00	0.35	0.18
	TV only	3	4.30	18.78	11.54
		4	0.00	0.00	0.00
		5	16.63	0.00	8.32
5. Initiating antagonistic behavior	TV-HV-MC	3	0.00	0.18	0.09
		4	0.58	0.27	0.43
		5	0.00	0.00	0.00
	TV-HV	3	1.10	0.00	0.55
		4	0.00	0.00	0.00
		5	0.00	0.15	0.08
	TV only	3	1.20	1.03	1.12
		4	0.00	0.00	0.00
		5	0.00	0.00	0.00
6. Refusing help	TV-HV-MC	3	0.00	0.00	0.00
		4	0.00	0.00	0.00
		5	0.00	0.00	0.00

(46)

Table I (Continued)

Variable - Proportion of time spent in:	Treat. Group	Sex			
		Age	Male	Female	Both Sexes
	TV-HV	3	0.00	0.00	0.00
		4	0.10	0.00	0.05
		5	0.04	0.08	0.06
	TV only	3	0.00	0.00	0.00
		4	0.00	0.00	0.00
		5	0.03	0.00	0.02
7. Responding with antagonism	TV-HV-MC	3	0.05	0.00	0.03
		4	0.30	0.03	0.17
		5	0.00	0.00	0.00
	TV-HV	3	0.00	0.00	0.00
		4	0.00	0.00	0.00
		5	0.36	0.18	0.27
	TV only	3	1.16	0.58	1.74
		4	0.00	0.00	0.00
		5	0.00	0.00	0.00
8. Working alone/ leaving work	TV-HV-MC	3	7.08	22.24	14.66
		4	5.20	19.33	12.27
		5	9.25	34.25	21.75
	TV-HV	3	4.68	8.85	6.74
		4	3.55	27.07	15.31
		5	2.10	10.20	6.15
	TV only	3	10.82	21.27	16.05
		4	19.90	27.95	23.93
		5	18.90	22.32	20.61

Table I (Continued)

Variable - Proportion of time spent in:	Treat. Group	Age	Sex		
			Male	Female	Both Sexes
9. Quiet participation/ nonverbal enthusiasm	TV-HV-MC	3	83.38	66.67	75.03
		4	72.68	70.12	71.40
		5	80.18	63.48	71.83
	TV-HV	3	76.63	58.58	67.64
		4	65.70	65.00	65.35
		5	84.82	84.77	84.80
	TV only	3	70.40	52.48	61.44
		4	73.88	68.48	71.18
		5	56.08	76.88	66.48
10. Initiating constructive behavior	TV-HV-MC	3	4.73	6.86	5.80
		4	13.05	2.98	8.02
		5	7.17	0.00	3.58
	TV-HV	3	8.18	0.63	4.41
		4	16.55	0.00	8.28
		5	9.10	0.85	4.98
	TV only	3	1.08	3.45	2.27
		4	4.12	1.68	2.90
		5	5.43	0.00	2.72
11. Asking questions/ requesting help	TV-HV-MC	3	0.20	0.38	0.29
		4	0.92	0.47	0.70
		5	0.35	0.05	0.20
	TV-HV	3	0.53	0.05	0.29
		4	3.20	0.00	1.60
		5	0.32	0.08	0.20

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Table I (Continued)

Variable - Proportion of time spent in:	Treat. Group	Age	Sex		
			Male	Female	Both Sexes
	TV only	3	0.04	1.43	0.74
		4	0.00	0.20	0.10
		5	0.30	0.04	0.17
12. Responding constructively	TV-HV-MC	3	3.90	2.78	3.34
		4	5.63	5.88	5.76
		5	2.60	1.70	2.15
	TV-HV	3	2.28	3.00	2.64
		4	10.48	7.60	9.04
		5	2.30	2.95	2.63
	TV only	3	1.58	0.73	1.16
		4	1.80	1.40	1.60
		5	1.97	0.48	2.45
13. Giving help	TV-HV-MC	3	0.00	0.00	0.00
		4	0.06	0.00	0.03
		5	0.10	0.15	0.13
	TV-HV	3	0.08	0.18	0.13
		4	0.05	0.00	0.03
		5	0.74	0.03	0.29
	TV only	3	0.16	0.00	0.08
		4	0.00	0.05	0.03
		5	0.40	0.00	0.20