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ABSTRACT

Traditional measures of intelligence frequently yield low scores when applied to disadvantaged subjects. This study tests whether similar findings would result from measures of developmental behavior. Accordingly, the developmental behavior of 159 culturally disadvantaged children (85 boys, 74 girls) was assessed by systematic interviewing of preschool and elementary school teachers using the Preschool Attainment Record (PAR). The children, enrolled in the Education Improvement Program (EIP) in Durham, North Carolina, were members of nine groups attending nursery, preschool, or ungraded primary school. Mean group ages ranged from 24.7 to 93.5 months. The results, by groups, are graphed and analyzed with respect to attainment age, attainment quotient, and the ambulation, manipulation, rapport, communication, responsibility, information, ideation, and creativity subscales of the PAR. Scores on the PAR are also compared with group mean scores on age-appropriate IQ measures. A steady decline in the rate of achievement and noticeable sex differences in performance appear as age increases. The measure proved useful and informative for evaluation purposes in this education improvement program for the culturally disadvantaged. Replication of the study with the same group and comparison with control groups are recommended to check the reliability of the findings. (LR)

THE EDUCATION IMPROVEMENT PROGRAM

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A Study of the Developmental Behavior of Culturally Disadvantaged Children

A Special Study Report on the PAR

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A Study of the Developmental Behavior of Culturally Disadvantaged Children[1]

Since traditional measures of intelligence such as the Stanford-Binet or the Wechsler Scales frequently yield low IQ scores when applied to disadvantaged child populations, it was felt important to test whether measures of developmental behavior would result in similar findings. This is a special study of that question.

Procedure

During the Fall of 1967, the developmental behavior of 159 culturally disadvantaged children was assessed by systematic interview of 14 preschool and elementary school teachers using the Preschool Attainment Record (PAR). The children were members of nine groups attending nursery, preschool or

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[1] A special study report from the Education Improvement Program, Duke University, Durham, North Carolina, March 1968.

ungraded primary school in the Education Improvement Program (EIP) in Durham, North Carolina. The groups ranged in mean age from 24.7 months to 93.5 months. There were 85 boys and 74 girls (see Table 1 for subject data).

In each group, the teacher most familiar with the development and behavior pattern of the child being assessed was interviewed. Interviews were conducted by trained Educational Technicians familiar with EIP.

The Preschool Attainment Record (PAR) is a measure yielding information in eight categories of developmental behavior: Ambulation, manipulation, rapport, communication, responsibility, information, ideation, creativity. Scores from the category subtests were combined to yield an attainment age (AA) which, when combined with the life age (LA) of the child, yields an attainment quotient (AQ). This AQ is roughly comparable to IQ or the SQ obtained on social maturity scales such as the Vineland Social Maturity Scale.

Results

Results of the study are given on Tables 2 through 10. Each table indicates first the mean chronological or life age of the children, mean AA's and AQ's for boys, girls and combined scores. Data are then reported for each group by category in terms of mean raw scores. Mean raw score ranges are reported for each total group by category.

Figure 1 indicates mean AQ data for all groups arranged in order from youngest to oldest. Also indicated is the year level of the group in EIP at the time of testing. Mean IQ data are posted for each group for comparison with PAR data. Figure 1a shows the distribution of AA data.

Figure 2 indicates AQ data as a function of years in EIP to demonstrate possible effects of program on behavioral development.

Figures 3 through 10 show mean raw scores by category for boys and girls in all groups.

Tables 11 and 12 indicate ranks of categories within groups. Tables 13 and 14 indicate rank order correlations for boys' and girls' data.

Table 1 (subject data) indicates a spread of mean AQ's from 89.1 to 137.6. Mean IQ's for the groups range from 78.1 to 111.8. Each of these sets of data (AQ and IQ) are posted on Figure 1. A steady declining function is noted in AQ and IQ scores as age increases except for IQ scores among the two oldest groups. These two groups have also been in the program the longest.

AQ data for boys and girls are not remarkably different except for group 042. Mean AQ scores for boys and girls differ significantly in that group. Figures 1 and 2 suggest declining ability with age and length of time in EIP. Since the two variables are confounded, it is felt that these data are best interpreted as a lack of effect of the program in slowing the ability decline or in preventing it rather than causing the decline. Control group data should help clarify this trend.

Figure 3 indicates data on ambulation for each of the nine groups. A steady profession upwards in ability with age (although, as the AQ data show, the rate of progress is not normal) with a flattening at 3.5 to 4.5 years, a drop at 6.5 years, especially in boys, and slight improvement after that period.

Manipulation (Figure 4) takes a sharper upward trend with age until 4.5 years when a sharp drop (again among the boys) is noticeable with a recovery at 5.5 years.

Rapport (Figure 5) data show a steady increase until 5.5 years where a sharp drop occurs among boys only with a recovery at 7.5 years.

Communication skills (Figure 6) suggest a slow, flat increase with age with minor sex differences, earlier in favor of the boys and later in favor of the girls.

Figure 7 shows responsibility data to be highly variable as age increases. Sharp drops are evident at 4.5 years and again after 6.5 years.

Information (Figure 8), like communication, moves steadily upward to 5.5 years with an abrupt flattening at that point in both boys and girls.

Ideation (Figure 9), as in information, responsibility, communication, rapport and ambulation, reflects early dominance of boys over girls performance with a reversal around 5.5 years of age.

Figure 10 indicates creativity data. A slow deceleration is noticeable to age 5.5 where girls continue to gain and boys drop away.

While the data in Tables 2 through 10 report specific means, raw scores and ranges for each group, Tables 11 and 12, indicating category rankings of performance within each group, and Tables 13 and 14, correlations between group rank orders, are of special interest.

Among the boys (Table 11), the highest performance in the youngest group was in the category of rapport, followed by ambulation and manipulation. The lowest abilities in this youngest group of boys were in the

categories of creativity, communication, information and ideation. A comparison of that data with those from the youngest group of girls (Table 12) reveals equally high performance in the area of rapport but correspondingly high performance in the area of information. This group has the smallest number of boys and girls and, consequently, the data are not too stable or reliable but some suggestion of higher cognitive or verbal abilities are apparent among the girls at an earlier age than these data would suggest one might find it among the boys.

Among the older groups, the boys continue to perform well in the nonverbal areas (ambulation, manipulation) but score poorest in the areas of creativity, responsibility, rapport and to a certain extent ideation. In the older group of girls creativity, information, ideation and communication are low, while ambulation, manipulation and rapport are higher.

Looking across categories and across groups for the boys, ambulation appears to be highest among the 4.5 year age group, while manipulation is highest at the 6 year level.

The youngest group of boys score highest on rapport, while the oldest score highest on communication. Responsibility appears to be best in the 4 to 6 year age range.

A cross category and cross group review of category rankings for the girls indiates that the majority of groups score highest on responsibility, next on ambulation and then on manipulation and rapport. Once again there is an exception among the two oldest groups where communication and information tend to be higher than previously found in the younger age groups. Across groups creativity rates consistently among the lowest

performance among categories as does ideation and information. In general, communication indicates relatively lower performance across groups.

It is strongly indicated that there is a rough division of verbal and non-verbal skills with the latter being consistently higher levels of performance on the PAR. However, there is a noticeable shifting away from these clear areas of ability as the children enter the beginning school age range.

Rank order correlations were drawn between groups on the rankings of categories in terms of highest to lowest performance levels (Tables 13 and 14).

There were high positive correlations between the rank ordering of performance on the PAR as a function of similarity in age. Correlations become lower and tend toward negative relationships as the disparity between the mean age between the groups compared increases. A review of the girl's correlation matrix will reveal that there is not a single negative correlation in the group and that there tend to be a greater number of high positive correlations between performance patterns in young and older groups. The interesting exception is the fact that there is not a single positive significant correlation between the youngest group of girls and any other group in the study. This is true as well for the oldest group of girls.

Tables 13 and 14 are interpreted as supportive of the initial clear disparity between verbal and non-verbal performance in the boys at the earlier age with considerably less disparity between these major areas of ability in the older groups or as the children approach school age.

On the other hand, the girls early demonstrate a greater combination of verbal and non-verbal levels contributing to their overall developmental pattern and there is consequent prolonged correlation between the groups as age increases.

Certainly alternative interpretations of the rank order correlations might be offered and a close perusal of these data would seem worthwile as well as comparison with control data and replication of the study itself using the same subjects with an approximate one-year interval between pre- and post-testing.

Summary

The Preschool Attainment Record (PAR) was administered to 159 culturally disadvantaged children, aged 2 through 7 years, in an effort to evaluate the developmental behavior of these children and its relationship to their intellectual performance.

Results indicated a steady decline in the rate of achievement as measured by the PAR with noticeable sex differences in performance as age increased.

In general, the PAR was found to be a useful and informative measure for an education improvement program for culturally disadvantaged children. Replication of the study with the same group and comparison with control groups were recommended to case further light on the reliability of the findings of the current study.

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FIG. 1: MEAN A.Q. DATA FROM PAR – ALL EIP GROUPS – FALL 1967

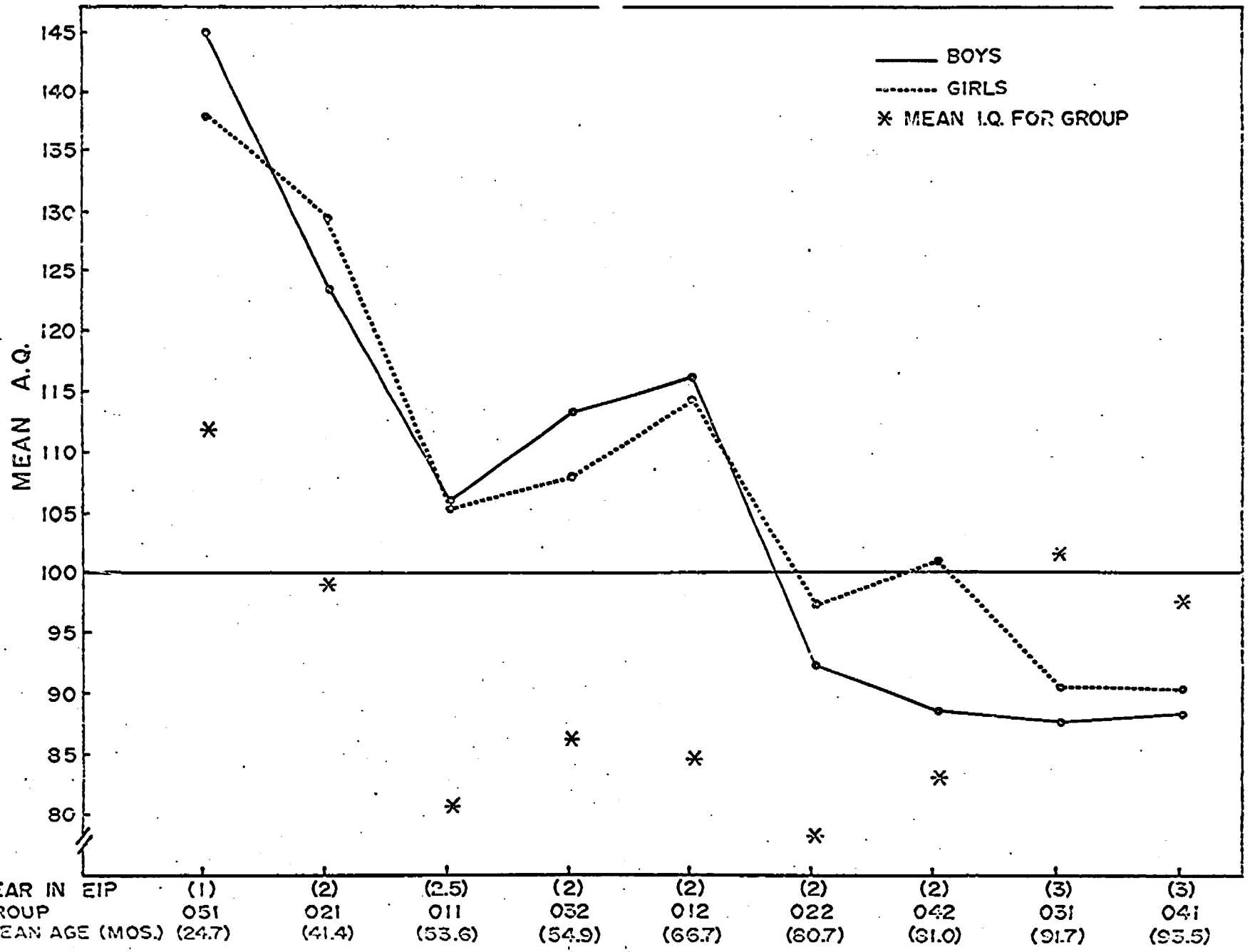


FIG. 1a: MEAN A.A. DATA FROM PAR BY AGE - ALL EIP GROUPS - FALL 1967

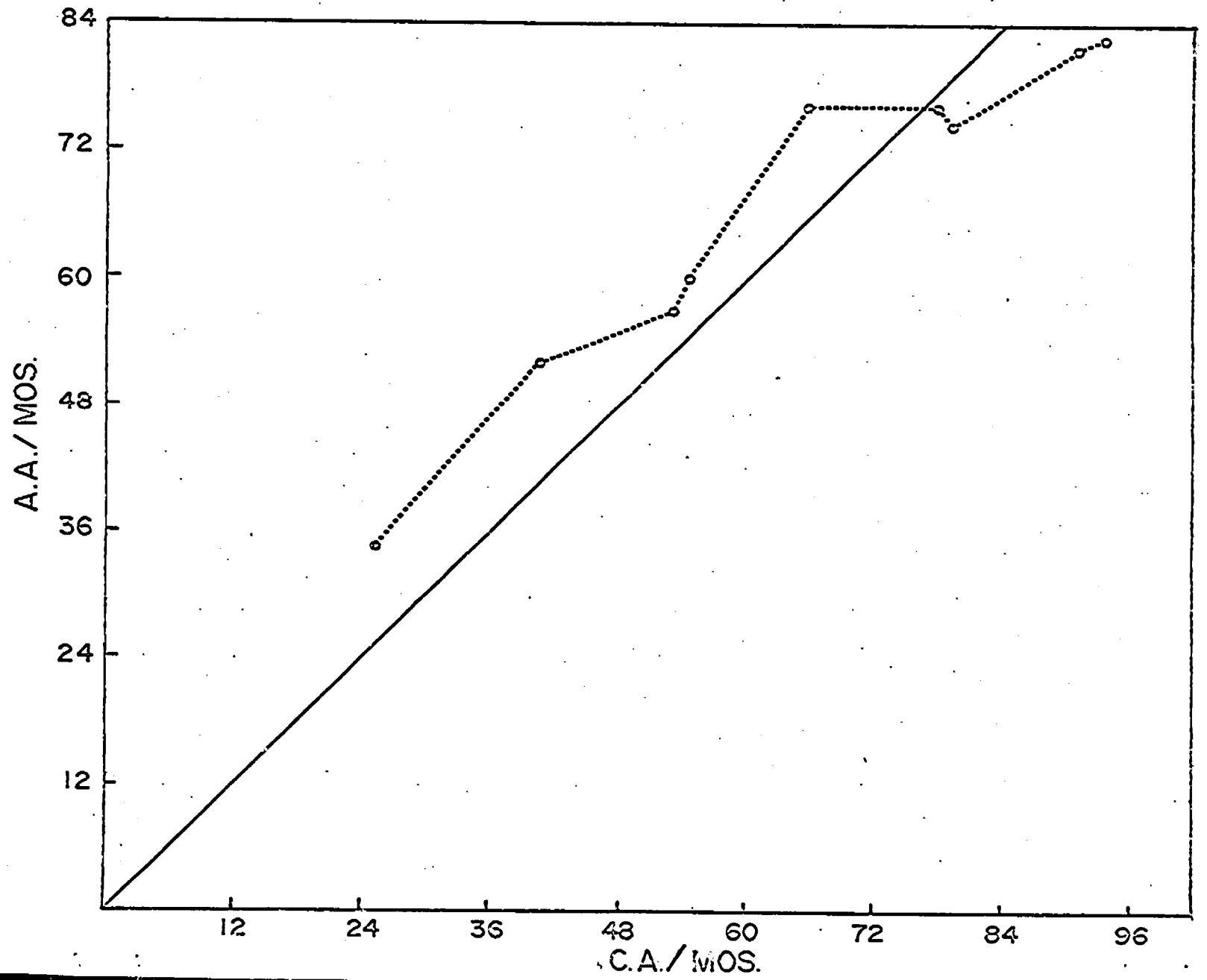


FIG. 2: MEAN A.Q. DATA X AGE X TENURE

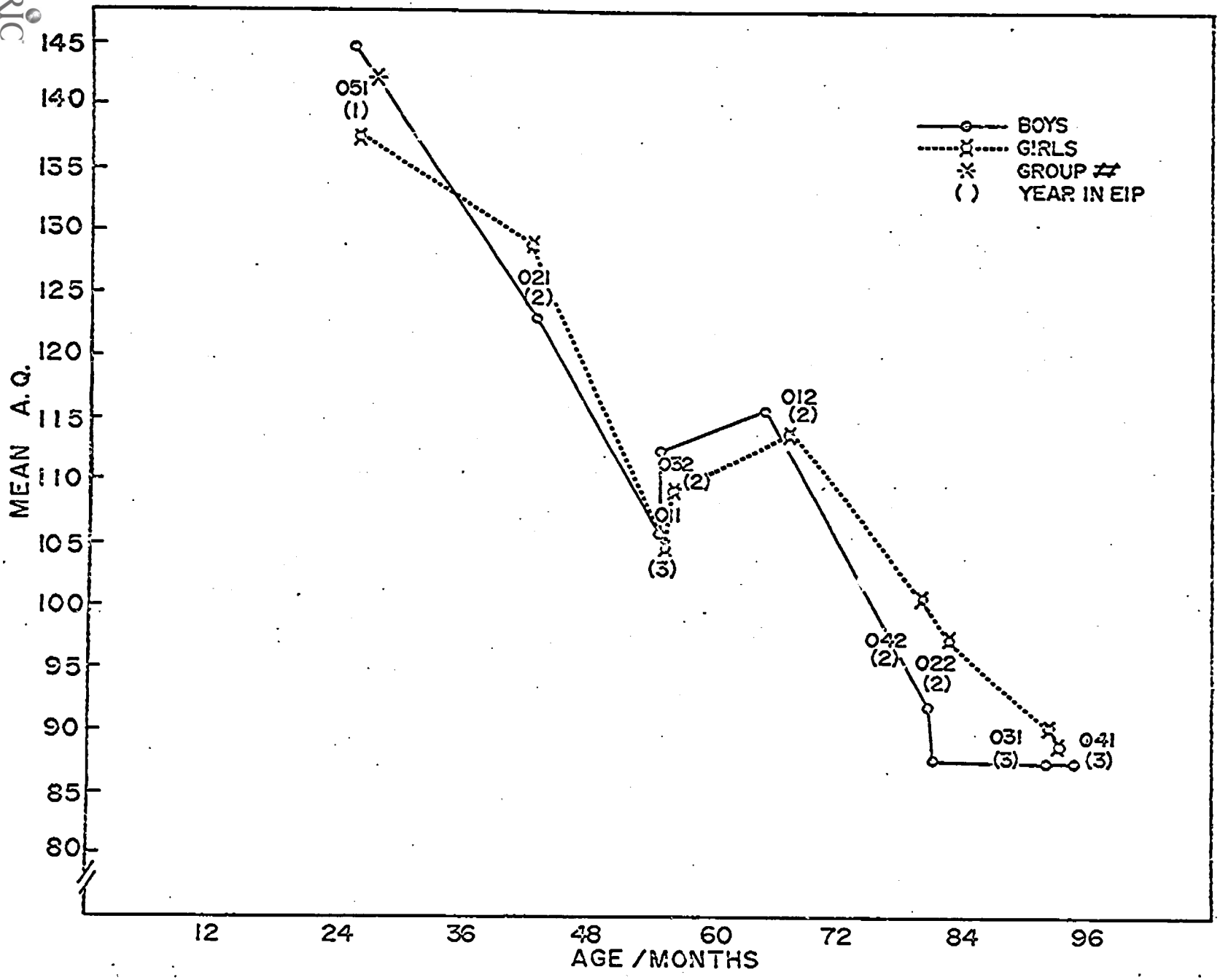


FIG. 3: AMBULATION – MEAN RAW SCORES – PAR – ALL EIP GROUPS – FALL 67

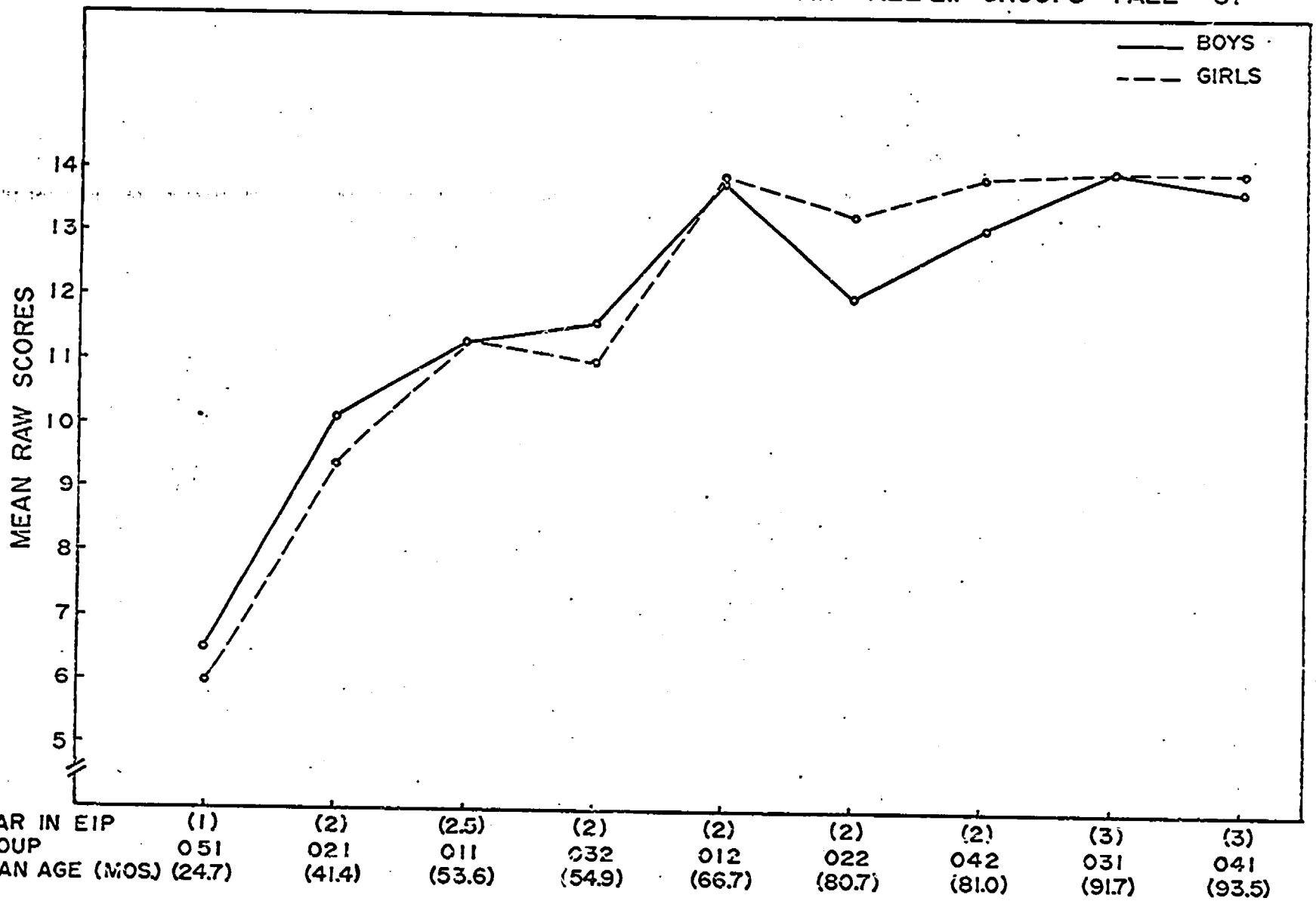


FIG. 4: MANIPULATION - MEAN RAW SCORES - PAR - ALL EIP GROUPS - FALL 1967

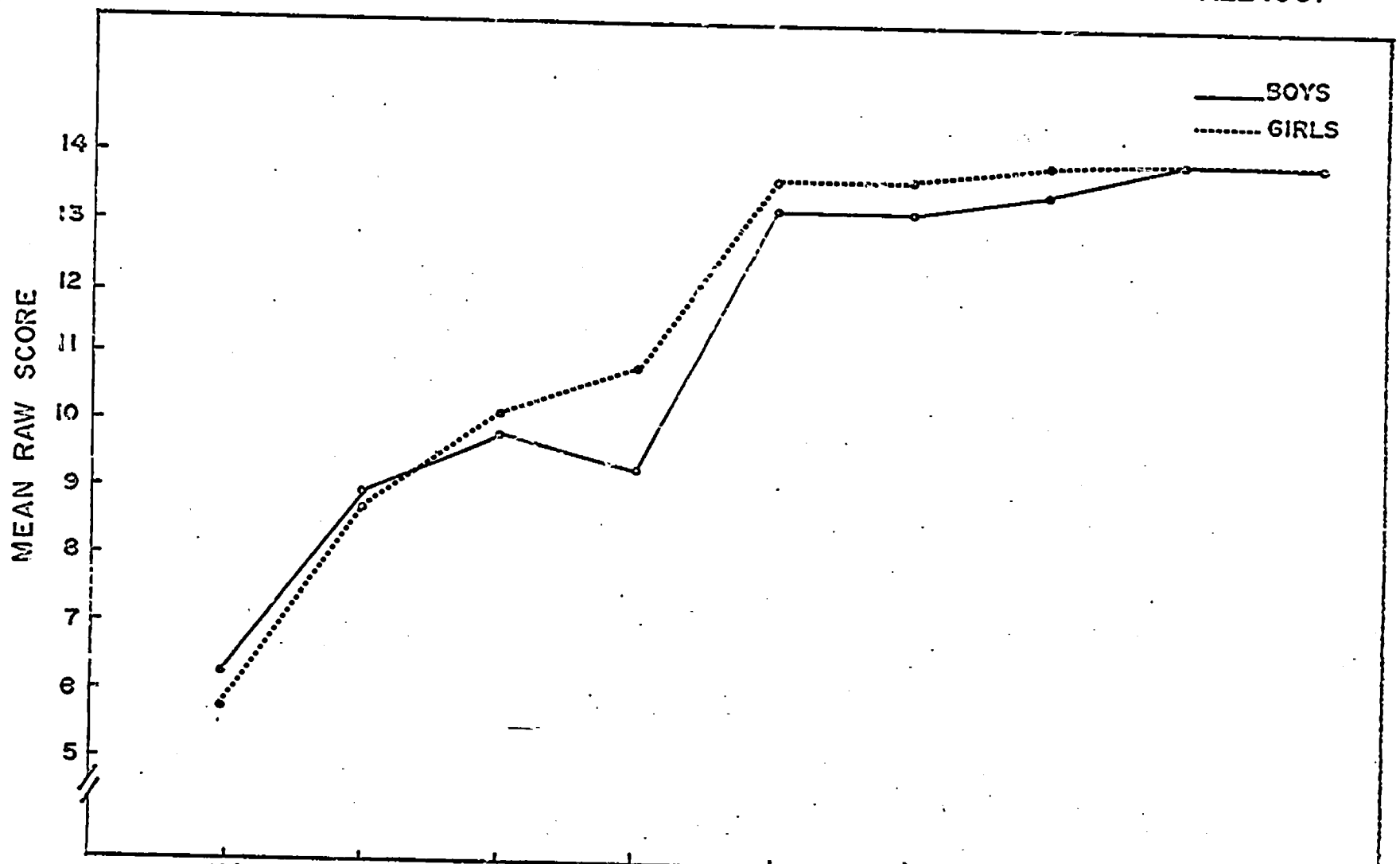


FIG. 5: RAPPORT-MEAN RAW SCORES - PAR- ALL EIP GROUPS- FALL 1967

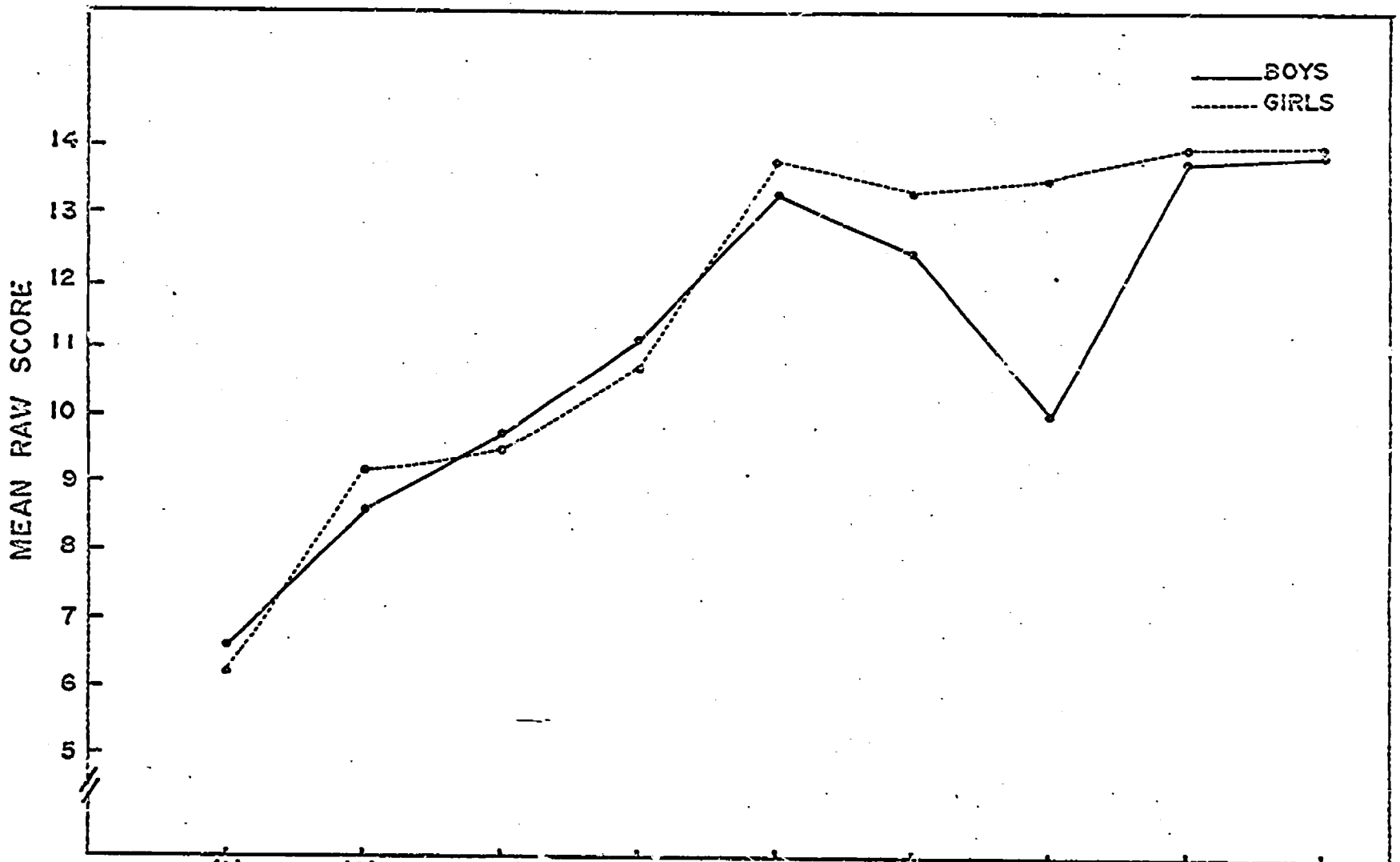
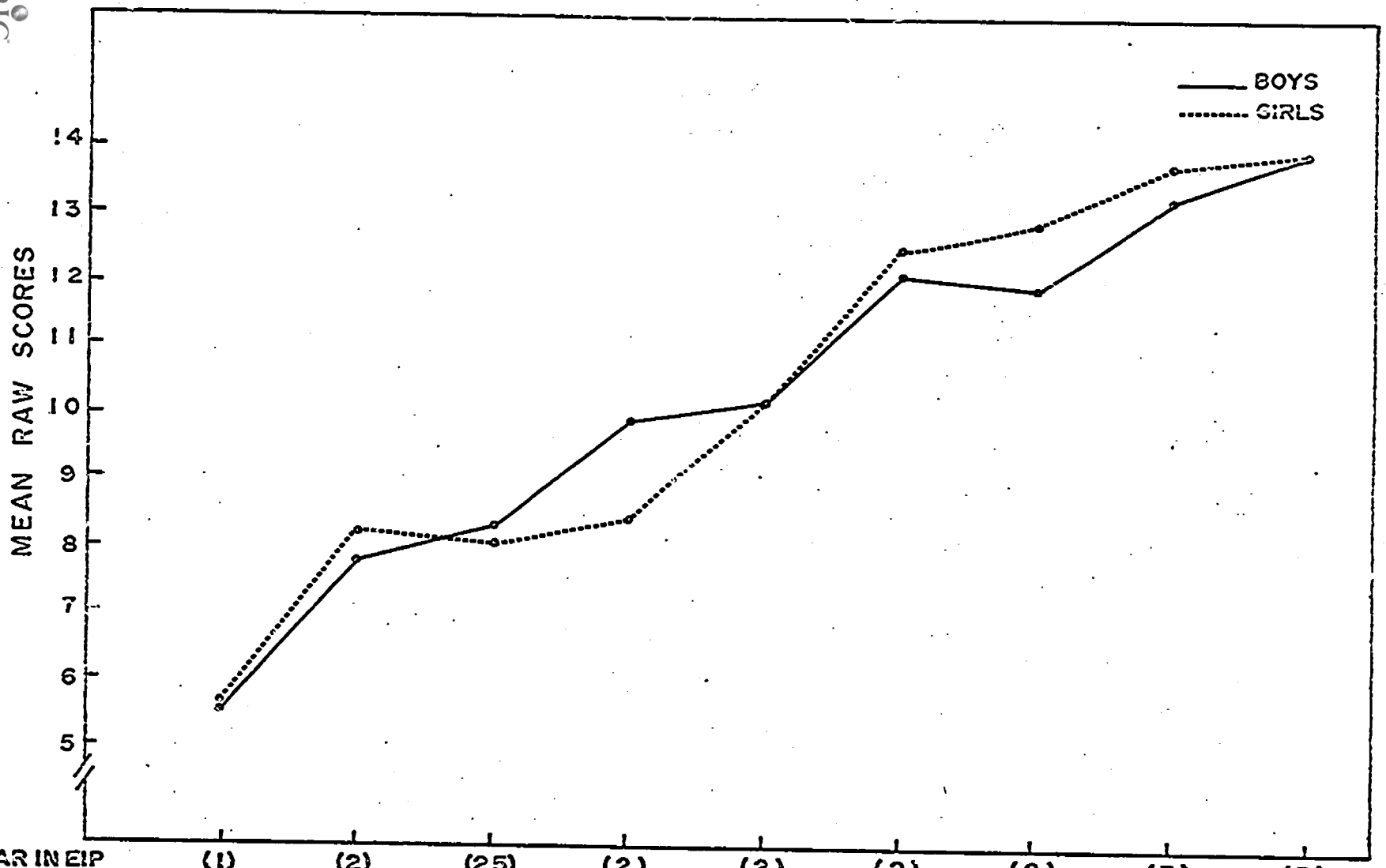


FIG. 6: COMMUNICATION- MEAN RAW SCORES - PAR - ALL EIP GROUPS - FALL 1967



YEAR IN EIP	(1)	(2)	(2.5)	(2)	(2)	(2)	(2)	(3)	(3)
GROUP	051	021	011	032	012	022	042	031	041
MEAN AGE(MOS.)	(24.7)	(41.4)	(53.6)	(54.9)	(66.7)	(80.7)	(81.0)	(91.7)	(93.5)

FIG. 7: RESPONSIBILITY – MEAN RAW SCORES – PAR – ALL EIP GROUPS – FALL 1977

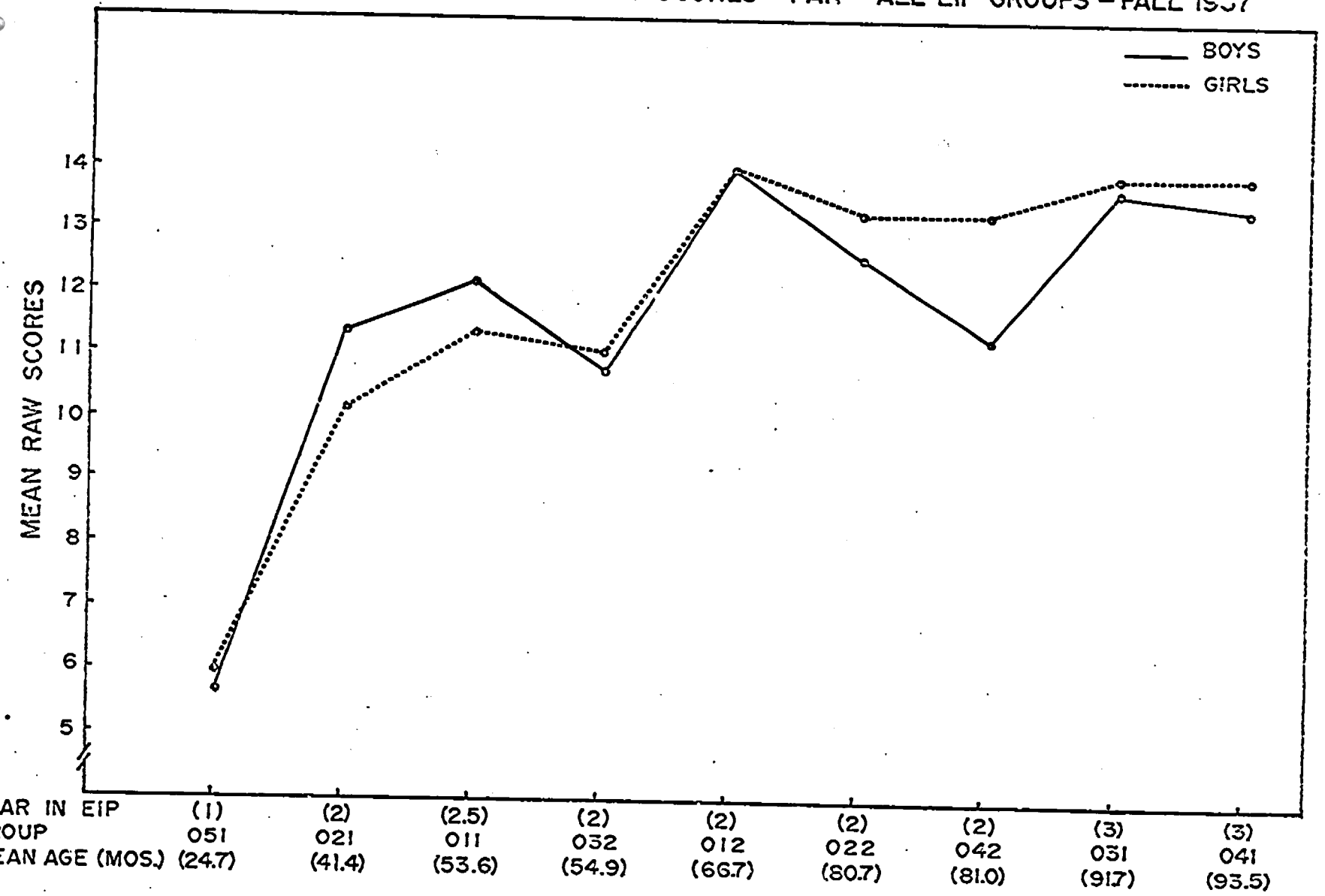


FIG. 8: INFORMATION - MEAN RAW SCO..ES - PAR - ALL EIP GROUPS - FALL 1967

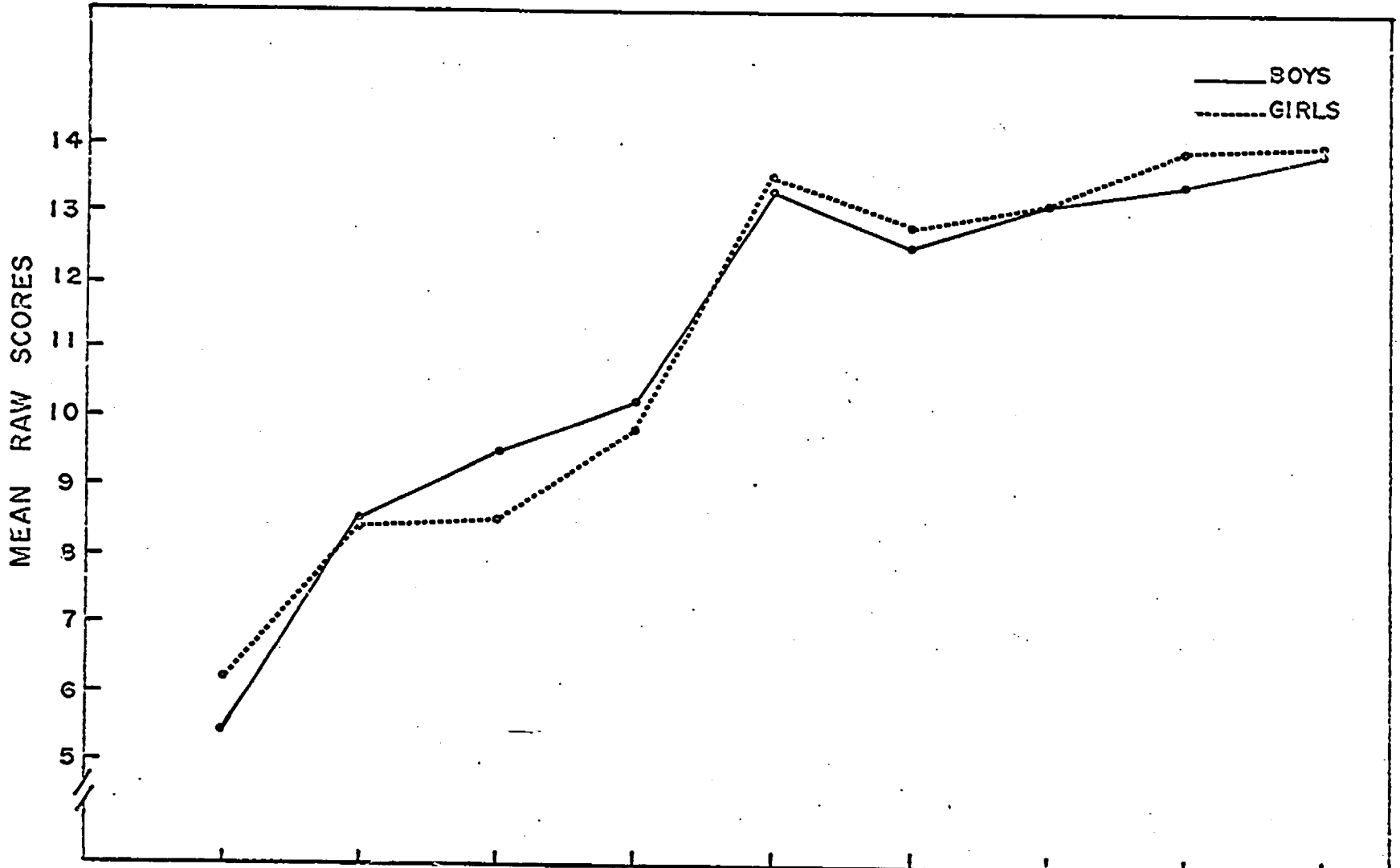
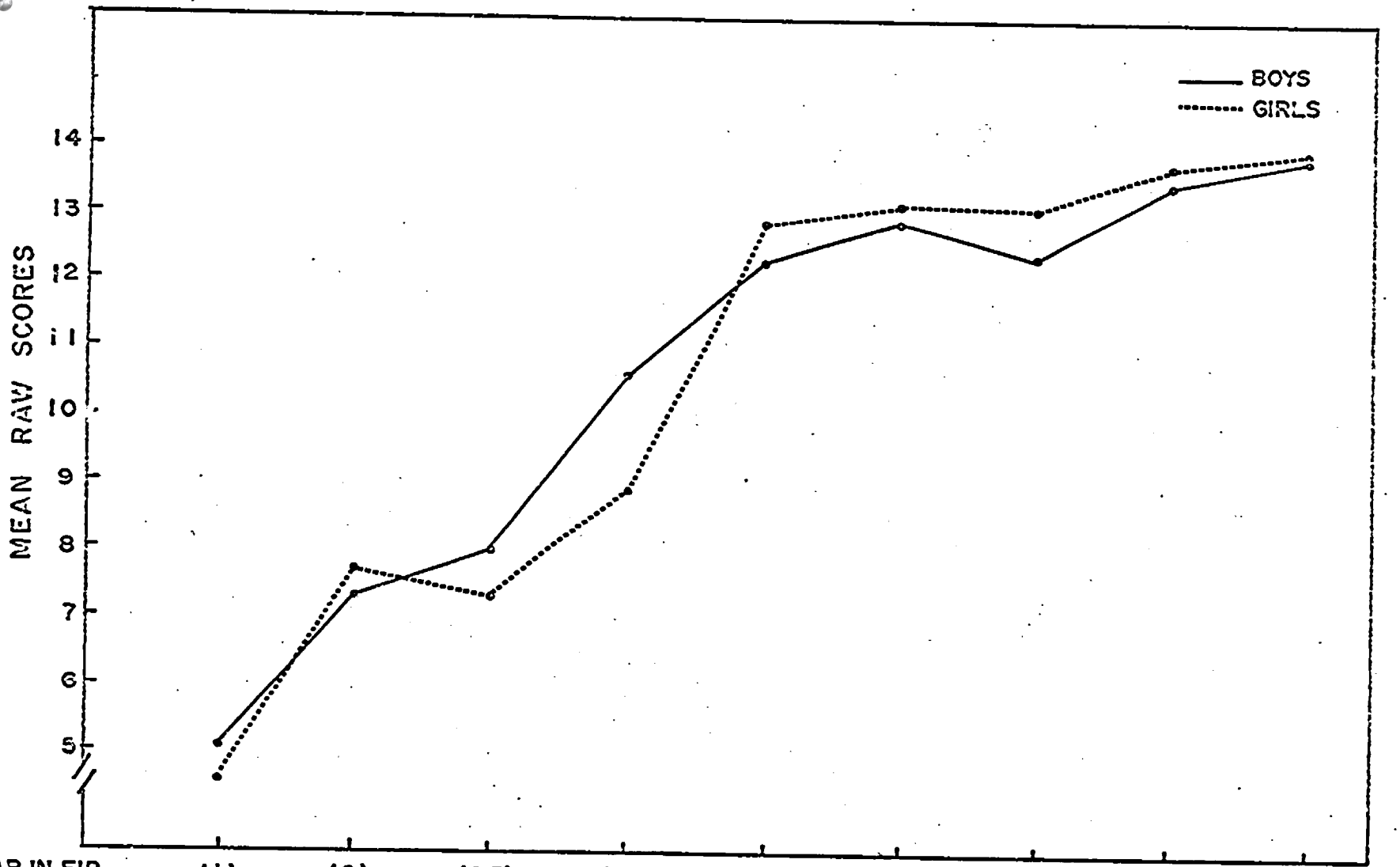


FIG.9: IDEATION - MEAN RAW SCORES - PAR - ALL EIP GROUPS - FALL 1967



YEAR IN EIP	(1)	(2)	(2.5)	(2)	(2)	(2)	(2)	(3)	(3)
GROUP	051	021	011	032	012	022	042	031	041
MEAN AGE(MOS.)	(24.7)	(41.4)	(53.6)	(54.9)	(66.7)	(80.7)	(81.0)	(91.7)	(93.5)

FIG. 10: CREATIVITY – MEAN RAW SCORES – PAR – ALL EIP GROUPS – FALL 1967

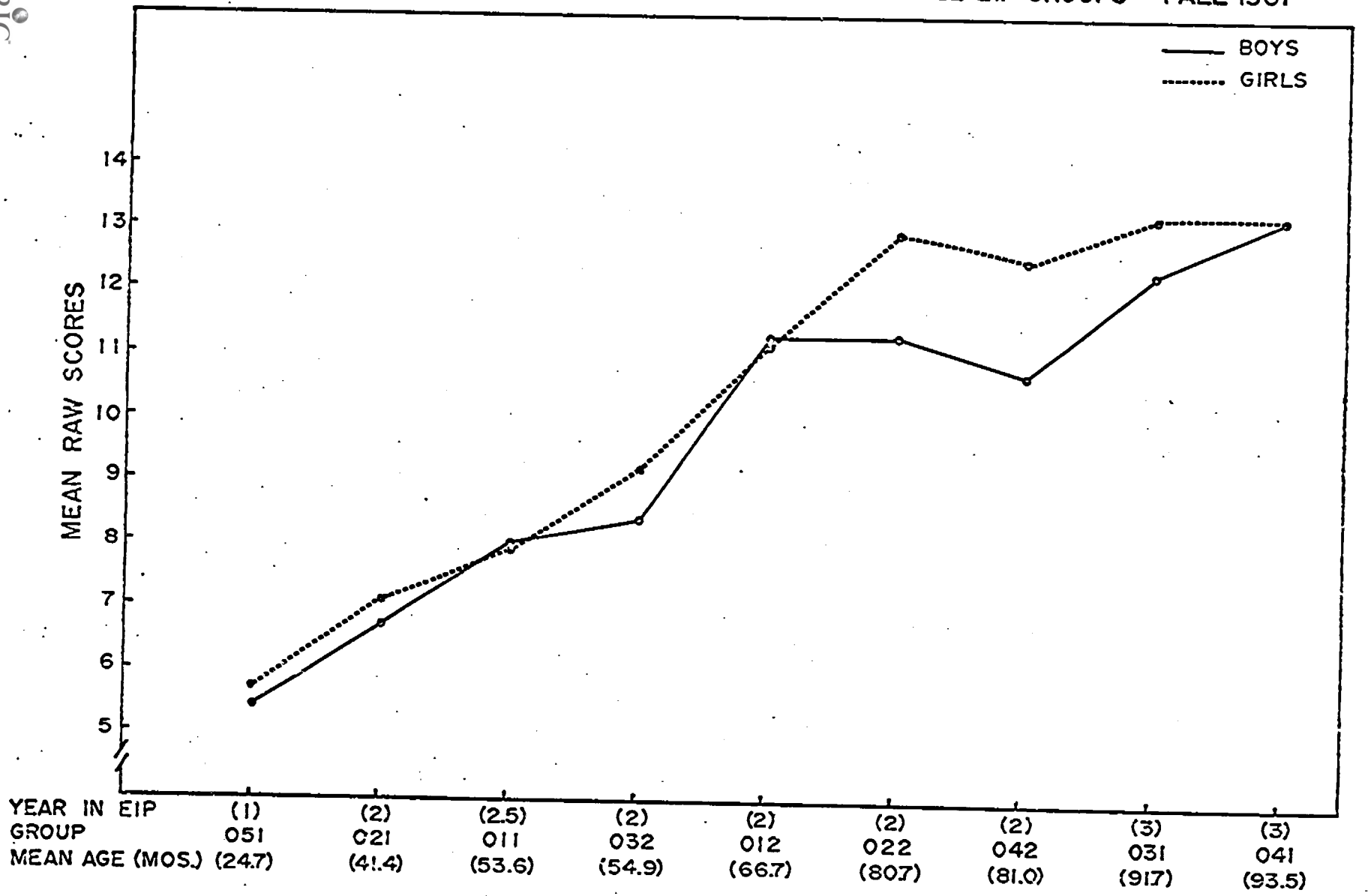


Table 1 Subject A.Q. and I.Q. Data

EIP Group	Total (N)	Boys (N)	Girls (N)	Mean C.A. (Mos.)	Mean A.Q.	Mean I.Q.	I.Q. Test	Years in EIP
051	9	5	4	24.7	137.6	111.8	Bayley Scales	1
021	16	8	8	41.4	126.5	98.9	S-B(LM)	2
011	14	6	8	53.6	105.6	80.6	WPPSI	3
032	16	10	6	54.9	111.2	86.1	WPPSI	2
012	16	6	10	66.7	115.3	84.8	WPPSI	2
022	24	14	10	80.7	94.6	78.1	WPPSI	2
042	20	13	7	81.0	92.9	83.4	WPPSI	2
031	24	12	12	91.7	89.7	101.2	WISC	3
041	20	11	9	93.5	89.1	97.6	WISC	3
Totals	159	85	74					

Table 2.

Mean PAR Scores (Mos.)

Fall 1967

Group	Sex	(N)	CA	AA	AQ
051	Boys	(5)	24.4	35.4	145.0
	Girls	(4)	25.0	34.5	138.0
	All	(9)	24.7	35.0	141.7

Group	Categories	Boys	Girls	All	Range
051	Ambulation	6.5	6.0	6.3	4.0 - 8.5 = 4.5
	Manipulation	6.2	5.7	6.0	5.0 - 7.0 = 2
	Rapport	6.6	6.2	6.4	5.0 - 9.0 = 4
	Communication	5.5	5.6	5.5	4.5 - 7.0 = 2.5
	Responsibility	5.7	6.0	5.8	4.0 - 7.5 = 3.5
	Information	5.4	6.2	5.8	5.0 - 7.0 = 2
	Ideation	5.0	4.5	4.8	4.0 - 6.0 = 2
	Creativity	5.6	5.9	5.7	5.0 - 7.0 = 2
	MEAN	5.81	5.76	5.79	2.8

Table 3.

Mean PAR Scores (Mos.)

Fall 1967

Group	Sex	(N)	CA	AA	AQ
021	Boys	(8)	42.6	52.1	123.6
	Girls	(8)	40.3	51.9	129.4
	All	(16)	41.4	52.0	126.5

Group	Categories	Boys	Girls	All	Range
021	Ambulation	10.1	9.4	9.9	7.0 -12.5 = 5.5
	Manipulation	8.9	8.7	8.8	5.5 -10.5 = 5
	Rapport	8.6	9.2	8.9	6.5 -12.0 = 5.5
	Communication	7.8	8.2	8.0	4.5 -10.0 = 5.5
	Responsibility	11.4	10.2	10.8	6.5 -13.0 = 6.5
	Information	8.5	8.4	8.5	6.0 -11.5 = 5.5
	Ideation	7.3	7.7	7.5	4.5 -10.5 = 6
	Creativity	6.9	7.3	7.1	5.0 - 9.0 = 4
	MEAN	8.7	8.6	8.7	5.4

Table 4.

Mean PAR Scores (Mos.)

Fall 1967

Group	Sex	(N)	CA	AA	AQ
011	Boys	(6)	54.5	57.8	106.1
	Girls	(8)	53.0	55.6	105.5
	All	(14)	53.6	57.3	105.6

Group	Categories	Boys	Girls	All	Range
011	Ambulation	11.3	11.3	11.3	8.5 -13.0 = 4.5
	Manipulation	9.8	10.1	10.0	7.5 -11.5 = 4
	Rapport	9.7	9.5	9.6	7.0 -11.5 = 4.5
	Communication	8.3	8.1	8.2	7.0 - 9.0 = 2
	Responsibility	12.2	11.4	11.7	9.5 -14.0 = 4.5
	Information	9.5	8.5	9.2	7.5 -12.0 = 4.5
	Ideation	8.0	7.3	7.6	5.5 -12.0 = 6.5
	Creativity	8.2	8.1	8.1	7.0 -10.0 = 3
	MEAN	9.6	9.4	9.5	4.9

Table 5.

Mean PAR Scores (Mos.)

Fall 1967

Group	Sex	(N)	CA	AA	AQ
032	Boys	(10)	54.4	61.6	113.2
	Girls	(6)	55.7	59.8	108.0
	All	(16)	54.9	60.3	111.2

Group	Categories	Boys	Girls	All	Range
032	Ambulation	11.6	11.0	11.4	10.0 -13.0 = 3
	Manipulation	9.3	10.8	9.9	8.5 -13.5 = 5
	Rapport	11.1	10.7	10.9	8.0 -12.5 = 4.5
	Communication	9.9	8.4	9.4	6.0 -10.5 = 4.5
	Responsibility	10.8	11.1	10.9	8.5 -13.0 = 4.5
	Information	10.2	9.8	10.1	6.5 -13.0 = 6.5
	Ideation	10.6	8.9	9.9	6.0 -12.0 = 6
	Creativity	8.6	9.4	9.1	6.0 -12.5 = 6.5
	MEAN	10.3	10.0	10.2	5.1

Table 6.

Mean PAR Scores (Mos.)

Fall 1967

Group	Sex	(N)	CA	AA	AQ
012	Boys	(6)	65.8	76.1	116.0
	Girls	(10)	67.3	77.2	114.8
	All	(16)	66.7	76.8	115.3

Group	Categories	Boys	Girls	All	Range
012	Ambulation	13.8	13.9	13.9	13 - 14 = 1
	Manipulation	13.2	13.6	13.4	12 - 14 = 2
	Rapport	13.3	13.8	13.6	12.5- 14 = 1.5
	Communication	10.2	10.2	10.2	9 - 11 = 2
	Responsibility	14.0	14.0	14.0	0
	Information	13.3	13.5	13.4	11 - 14 = 3
	Ideation	12.3	12.9	12.7	11 - 13 = 2
	Creativity	11.5	11.4	11.4	10.5- 14 = 3.5
	MEAN	12.7	12.9	12.8	1.9

Table 7.

Mean PAR Scores (Mos.)

Fall 1967

Group	Sex	(N)	CA	AA	AQ
022	Boys	(14)	80.3	74.2	92.5
	Girls	(10)	81.3	79.1	97.6
	All	(24)	80.7	76.25	94.6

Group	Categories	Boys	Girls	All	Range
022	Ambulation	12.0	13.3	12.5	8.0 - 14.0 = 6
	Manipulation	13.2	13.7	13.4	10.0 - 14.0 = 4
	Rapport	12.4	13.3	12.8	8.5 - 14.0 = 5.5
	Communication	12.1	12.55	12.3	9.0 - 14.0 = 5
	Responsibility	12.6	13.35	12.9	8.0 - 14.0 = 6
	Information	12.5	12.8	12.5	10.0 - 14.0 = 4
	Ideation	12.9	13.2	13.0	9.0 - 14.0 = 5
	Creativity	11.5	13.15	12.2	8.0 - 14.0 = 6
	MEAN	12.4	13.2	12.7	5.2

Table 8.

Mean PAR Scores (Mos.)

Fall 1967

Group	Sex	(N)	CA	AA	AQ
042	Boys	(13)	81.7	72.1	88.6
	Girls	(7)	79.7	80.0	100.9
	All	(20)	81.0	74.8	92.9

Group	Categories	Boys	Girls	All		
042	Ambulation	13.1	13.9	13.4	10.0 -14.0 =	4
	Manipulation	13.5	13.9	13.6	12.0 -14.0 =	2
	Rapport	10.0	13.5	11.2	8.0 -14.0 =	6
	Communication	11.9	12.9	12.3	7.0 -14.0 =	7
	Responsibility	11.3	13.3	12.0	9.0 -14.0 =	5
	Information	13.1	13.1	13.1	12.0 -14.0 =	2
	Ideation	12.4	13.1	12.6	8.0 -14.0 =	6
	Creativity	10.9	12.7	11.5	6.0 -14.0 =	8
	MEAN	12.0	13.2	12.4		5

Table 9.

Mean PAR Scores (Nos.)

Fall 1967

Group	Sex	(N)	CA	AA	AQ
031	Boys	(12)	91.7	82.0	88.0
	Girls	(12)	91.8	83.0	90.5
	All	(24)	91.7	82.2	89.7

Group	Categories	Boys	Girls	All	Range
031	Ambulation	14.0	14.0	14.0	0
	Manipulation	14.0	14.0	14.0	0
	Rapport	13.8	14.0	13.9	13.0 -14.0 = 1
	Communication	13.3	13.8	13.6	11.0 -14.0 = 3
	Responsibility	13.7	13.9	13.8	11.0 -14.0 = 3
	Information	13.4	13.9	13.7	12.0 -14.0 = 2
	Ideation	13.5	13.8	13.7	12.5 -14.0 = 1.5
	Creativity	12.5	13.4	13.0	9.5 -14.0 = 4.5
	MEAN	13.5	13.8	13.7	1.9

Table 10.

Mean PAR Scores (Mos.)

Fall 1967

Group	Sex	(N)	CA	AA	AQ
041	Boys	(11)	95.4	82.6	88.1
	Girls	(9)	92.2	83.3	90.2
	All	(20)	93.5	82.9	89.1

Group	Categories	Boys	Girls	All	Range
041	Ambulation	13.7	14.0	13.8	12.0 -14.0 = 2
	Manipulation	14.0	14.0	14.0	0
	Rapport	13.9	14.0	13.9	12.5 -14.0 = 1.5
	Communication	14.0	14.0	14.0	0
	Responsibility	13.4	13.9	13.6	11.0 -14.0 = 3
	Information	13.95	14.0	13.97	13.5 -14.0 = .5
	Ideation	13.95	14.0	13.97	13.0 -14.0 = 1
	Creativity	13.4	13.4	13.4	11.5 -14.0 = 2.5
	MEAN	13.8	13.9	13.8	1.3

Table 11.

PAR Category Rankings of Mean Raw Scores in All EIP Groups

Boys - Fall 1967

Categories	051	021	011	032	012	022	042	031	041
1/ Ambulation	2	2	2	1	2	7	2.5	1.5	6
2/ Manipulation	3	3	3	7	5	1	1	1.5	1.5
3/ Rapport	1	4	4	2	3.5	5	8	3	5
4/ Communication	6	6	6	6	8	6	5	7	1.5
5/ Responsibility	4	1	1	3	1	3	6	4	7.5
6/ Information	7	5	5	5	3.5	4	2.5	6	3.5
7/ Ideation	8	7	8	4	6	2	4	5	3.5
8/ Creativity	5	8	7	8	7	8	7	8	7.5

1 = Highest Rank

Table 12.

PAR Category Rankings of Mean Raw Scores in All EIP Groups

Girls - Fall 1967

	051	021	011	032	012	022	042	031	041
Categories									
1/ Ambulation	3.5	2	2	2	2	3.5	1.5	2	3.5
2/ Manipulation	6	4	3	3	4	1	1.5	2	3.5
3/ Rapport	1.5	3	4	4	3	3.5	3	2	3.5
4/ Communication	7	6	6.5	8	8	8	7	6.5	3.5
5/ Responsibility	3.5	1	1	1	1	2	4	4.5	7
6/ Information	1.5	5	5	5	5	7	5.5	4.5	3.5
7/ Ideation	8	7	8	7	6	5	5.5	6.5	3.5
8/ Creativity	5	8	6.5	6	7	6	8	8	8

1 = Highest Rank

Table 13.

Rank Order Correlations of PAR Category Rankings for Boys

	051	021	011	032	012	022	042	031
021	.619							
011	.690*	.976**						
032	.429	.595	.500					
012	.482	.851**	.827*	.732*				
022	-.190	.286	.142	-.024	.185			
042	-.173	.256	.185	-.089	.077	.446		
031	.685*	.780*	.708*	.565	.631	.411	.423	
041	-.256	-.149	-.244	-.280	.446	.470	.554	.101

** = $p < .01$

* = $p < .05$

Table 14.

Rank Order Correlations of PAR Category Rankings for Girls

	051	021	011	032	012	022	042	031
021	.548							
011	.542	.935**						
032	.536	.881**	.958**					
012	.571	.929**	.899**	.952**				
022	.137	.661*	.726*	.815*	.780*			
042	.310	.774*	.744*	.762*	.786*	.810*		
031	.524	.786*	.738*	.714*	.750*	.685*	.952**	
041	.190	.292	.137	.077	.185	.167	.554	.620

** = $p < .01$

* = $p < .05$

Reference

Doll, E., Preschool Attainment Record. American Guidance Service, Inc., Circle Pines, Minnesota, 1967.