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TASK PERSISTENCE IN EARLY
CHILDHOOD EDUCATION

by

Thomas Richard Stephenson

A dissertation submitted in partial fulfillment
of the requirements for the degree

of

DOCTOR OF PHILOSOPHY

in

Psychology

Approved:

UTAH STATE UNIVERSITY
Logan, Utah

1973

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Thomas Richard Stephenson

TABLE OF CONTENTS

	Page
ACKNOWLEDGMENTS	i
LIST OF TABLES	vii
LIST OF FIGURES	ix
ABSTRACT	x
INTRODUCTION	1
Statement of the problem	1
Definition of Terms	2
REVIEW OF LITERATURE	4
Task Persistence Variables	4
Innate and maturational consideration	4
Environmental considerations	7
Task Persistence and Achievement	9
Task Persistence and Training	11
Developmental Trends of Task Persistence	12
Task Persistence and Sex	14
Task Persistence and Social Advantage	15
Task Persistence and Ethnic Groups	17
Task Persistence and Personality and Ability Variables	17
Conclusions	19
METHOD	20
Purpose and Objectives	21
Population and Sample	23
Population	23
Sample	23
Design	24
Experimental Procedure	26
Task selection	26
The pilot group	26
The experimental sessions	31
Data collection	33

TABLE OF CONTENTS (Continued)

	Page
RESULTS	34
Original Study	34
Introduction	34
Time on task	35
Time away from task	35
Number of completed tasks	40
Number of times away from task	43
Summary	45
Extended Study	47
Introduction	47
Verbalizations - Introduction	48
Task relevant verbalizations	48
Task irrelevant verbalizations	53
Total number of verbalizations	54
Summary	57
Completion of Tasks--Proportion Tables	59
Summary	67
Correlation Matrix	68
DISCUSSION	70
Limitations of study	70
Summary of results	72
Interrelationship of variables	74
Time on and off task	76
Completion of tasks	78
Verbalizations and developmental trends	79
Verbalizations and ethnic differences	80
Verbalizations and sex differences	81
Verbalizations and social class	82
Verbalization implications for ECE	83
SUMMARY AND CONCLUSIONS	85
Introduction	85
Task persistence	85
Completion of task	85
Verbalization	86
Correlations	87
Independence	87
Conclusion	87

TABLE OF CONTENTS (Continued)

	Page
REFERENCES	89
VITA	97

LIST OF TABLES

Table	Page
1. Black subjects	24
2. White subjects	25
3. Black subjects	25
4. White subjects	25
5. Items of clothing and linen	28
6. Total time on task (means)	30
7. Analysis of variance: Total time on task (age)	30
8. Analysis of variance: Total time on task (sex)	30
9. Analysis of variance: Total time on task	36
10. Scheffe's Multiple Comparison Test: F-ratios for total time on task	37
11. Analysis of variance: Total time away from the task	38
12. Scheffe's Multiple Comparison Test: F-ratios for total time away from the task	39
13. Chi square: Completion of task at ages 2, 4, and 6	40
14. Chi square: Completion of tasks by Black and White subjects	41
15. Chi square: Completion of tasks by male and female subjects	42
16. Chi square: Completion of tasks by advantaged and dis- advantaged subjects	43
17. Analysis of variance: Number of times away from the task	45
18. Analysis of variance: Number of task relevant verbalizations	50
19. Scheffe's Multiple Comparison Test: F-ratios for total number of relevant verbalizations	51
20. Analysis of variance: Number of task irrelevant verbalizations	55

21. Scheffe's Multiple Comparison Test: F-ratios for total number of irrelevant verbalizations	55
22. Analysis of variance: Total number of verbalizations	57
23. Scheffe's Multiple Comparison Test: F-ratios for total number of verbalizations	58
24. Chi square: Number of completed tasks by advantaged, White females	60
25. Chi square: Number of completed tasks by disadvantaged, White females	61
26. Chi square: Number of completed tasks by disadvantaged, Black females	62
27. Chi square: Number of completed tasks by advantaged, Black females	63
28. Chi square: Number of completed tasks by advantaged, White males	64
29. Chi square: Number of completed tasks by disadvantaged, White males	65
30. Chi square: Number of completed tasks by disadvantaged, Black males	66
31. Chi square: Number of completed tasks by advantaged, Black males	67
32. Correlation matrix: Total group on all variables	69

LIST OF FIGURES

Figure	Page
1. Human figure and room drawings presented to subjects	27
2. Mean time spent on task for pilot group subjects	31
3. Mean total time (minutes) spent on task at ages 2, 4, and 6 for four groups (total group, race, sex, and social class)	37
4. Mean total time (minutes) away from the task at ages 2, 4, and 6 for four groups (total groups, race, sex, and social class)	39
5. Percent of subjects completing task at ages 2, 4, and 6 for four groups (total group, race, sex, and social class) .	44
6. Mean number of task relevant verbalizations at ages 2, 4, and 6 for four groups (total group, race, sex and social class)	51
7. Developmental verbalization patterns of males and females at ages 2, 4, and 6	52
8. Mean number of task relevant verbalizations for advantaged and disadvantaged, Black and White subjects	53
9. Mean number of task irrelevant verbalizations at ages 2, 4, and 6 for four groups (total group, race, sex, and social class)	56
10. Mean number of task irrelevant verbalizations for advantaged and disadvantaged children at ages 2, 4, and 6 .	56
11. Mean total of verbalizations at ages 2, 4, and 6 for four groups (total, race, sex, and social class)	58

ABSTRACT

Task Persistence in Early
Childhood Education

by

Thomas Richard Stephenson, Doctor of Philosophy

Utah State University, 1973

Major Professor: Dr. David R. Stone
Department: Psychology

This study was designed to discover developmental trends in task persistence (TP). It was hoped that the results would suggest when and for what groups a task persistence (TP) curriculum is crucial.

To study this development a sample of two, four, and six year old children were given a "work" task. The task required 120 subjects (Ss) to sort and fold 33 items of clothing and linen. After the task instructions and demonstration, the experimenter did not intervene with reinforcers or further directions.

The dependent variables investigated were time spent on the task, time spent away from the task, and number of tasks completed. The independent variables were age, race (Black and White), sex, and social class (advantaged and disadvantaged). The data were analyzed with analysis of variance, Pearson's Product-Moment Correlation, and chi square.

The results indicated that older children spent significantly more time on task and significantly less time away from task than younger children. Black children spent significantly more time (than White children) on and away from the task at all ages. Advantaged children

spent significantly more time (than disadvantaged children) on task at all ages and significantly less time away from task at ages two and four. Advantaged and disadvantaged subjects were not differentiated by the time spent away from the task at age six. These results imply that task persistence training programs could begin as early as age two. They also suggest that certain subgroups (i.e., disadvantaged White) may require more intensive task persistence training than other subgroups (i.e., advantaged Black).

Completion of tasks (CT) significantly differentiated six year olds from two and four year olds, but failed to differentiate two and four year olds. Tasks were completed significantly more often at ages two and four by males than females and by advantaged than disadvantaged children. However, these differences disappeared by age six. Since the differences faded at age six, the use of completion of tasks training as a general curriculum goal may not be warranted.

Some of the most surprising results were described by the significant correlation coefficients. The total time spent on the task was negatively related to completion of task. Completion of task was positively related to the time spent away from the task and number of times away from task. These findings suggest that brief periods of absence from a task may improve the chances of completing the task. Therefore, optimal "work" performance for early childhood education may be realized by programming frequent, brief "breaks."

A secondary purpose of the study was to investigate verbalizations expressed during the experimental sessions. To study this variable, a verbatim record was established and maintained for each subject. The verbalizations were then totaled and classified as task relevant or

irrelevant. The results were analyzed with an analysis of variance (age x race x sex x social class) and Pearson's Product Moment Correlation. Although the number of verbalizations increased with age, the differences between ages four and six were not significant. This finding may reflect a shift to covert verbal mediation during "work" performance on or about age four.

The developmental patterns of verbalizations were different for boys and girls. The girls used more overt verbalizations (than boys) at ages two and four; however, at age six the girls' number of verbalizations decreased noticeably. The verbalizations of boys increased with age. At age six, they used more verbalizations than the girls. The writer concluded that this finding reflected advanced verbalization skills in the girls. If the conclusion is valid, the results may mean that overt verbalizations are more necessary for boys to organize their experiences.

White children used significantly more task relevant verbalizations than Black children. This suggests that early childhood educational programs for predominately Black populations may need to stress task relevant verbalization training more than programs which serve predominately White populations.

Disadvantaged children used more task irrelevant verbalizations at ages two and six than advantaged children. Apparently, they need extra emphasis on task oriented verbalization training. When considered with the previous paragraph, the disadvantaged Black population has the greatest need for task relevant verbalization training.

INTRODUCTION

Statement of the Problem

A crucial aspect of community education is the prevention of academic failure. Educators generally agree that opportunities for prevention are probably optimal during the preschool years (Gray, Klaus, Miller, and Forrester, 1966; Robinson and Robinson, 1968). However, many early childhood education (ECE) programs have failed to capitalize on these opportunities. The lack of data for curriculum development in early childhood education (ECE) may be one reason for their failure to implement successful prevention programs.

To initiate an adequate prevention program, the educator should be able to (1) identify and define most entry skills necessary for adequate performance in public schools, (2) determine at what age specific entry skills should be introduced into a curriculum, and (3) individualize curricula to special needs of special preschool populations. However, the answers to these considerations are not currently in the literature. As a result, many educators in ECE rely on global, humanistic philosophies, "common sense," and personal beliefs to develop curricula. In most instances, such curricula are founded on hypothetical constructs, which are often difficult to operationally define or objectively evaluate. Therefore, programs are often originated without research data and, too frequently, are unable to generate data needed to objectively evaluate the efficiency of their curricula.

Many ECE writers believe that one entry skill necessary for a child to profit from formal educational experiences is the ability to maintain task oriented behavior and resist distractions (task persistence) (TP) (Bereiter and Engelmann, 1966; Bereiter, 1967; Maccoby, 1968; Kohlberg, 1968; Cazden, 1968). Although unproven in ECE, research with "older groups" (elementary and older) has confirmed that task persistence (TP) is related to academic achievement (Ryans, 1939; Frye and Spruill, 1965; Hunter and Johnson, 1971) and sensitive to modification programs (Martin and Powers, 1966; Hall, Lund and Jackson, 1968).

School is analogous to a work situation. No studies reviewed for this research investigated task persistence (TP) behavior of preschool children on "work" tasks. In addition, the literature fails to clearly indicate (1) whether early developmental trends exist for task persistence (TP) on "work" tasks and (2) whether ethnic, sexual, and social groups develop different task persistence (TP) patterns in early childhood. If the available data were expanded in these areas, educators could more confidently decide whether task persistence (TP) is appropriate for ECE and, if so, when and for what groups to intervene. The problem is, then, the lack of research data to suggest whether task persistence (TP) should be part of an early childhood education (ECE) program and, if so, when and for what groups a task persistence (TP) curriculum is appropriate.

Definition of Terms

Task persistence (TP) is the voluntary continuation of goal oriented behavior despite fatigue, discouragement, or distractions (Crutcher, 1934; Cushing, 1929; Ryans, 1938c; Mangan, 1959;

McClintock, 1962). It involves little cognitive activity (Mangan, 1959). TP is not perseveration, defined as the continuing repetition of a specific behavior pattern after its utility has ceased (Ryans, 1938c; Coville, Costello, and Rouke, 1960; Hutt, 1969). TP and sustained attention are often used interchangeably.

A "work" task is a unit of productive behavior. It implies that a constructive sequence of behaviors is needed to successfully complete a task. Although pleasure may be derived from the goal-oriented behavior, the ultimate goal is satisfactory completion of the task. In contrast, a "play" task is maintained and directed for recreational pleasure. "Play" may not always be productive or require completion of a task. It is assumed that a "work" task would be more analogous to school performance than a "play" task.

REVIEW OF THE LITERATURE

Task Persistence Variables

Innate and maturational considerations

Before TP can be effectively studied, a familiarization with the variables that promote persistent behavior is needed. This selection of studies will investigate the innate, maturational variables related to persistence.

Kagan (1971, p. 36) has observed the highly variable intensity of stimulation needed to attract infants' attention. He believes this implies some innate predisposition to attend to varying intensities of stimulation.

General activity is also congenital (Mussen, Conger, and Kagan, 1969, p. 199). Several studies (Matheny and Brown, 1971; Rubenstein, 1967; Yarrow, 1963; Kagan and Lewis, 1965) have reported an inverse relationship between activity level and sustained attention. Matheny and Brown (1971) investigated 56 pairs of same sex twins at ages 3-48 months. The results indicated that sustained attention is directly related to fine motor development and placidity. A high activity level, frequency of temper outbursts, and onset of walking were inversely related to sustained attention. Another study by Rubenstein (1967) investigated the sustained attention of 44 infants, 5 months of age. Infants were classified as high, median, and low attenders. High attenders spent significantly more time looking, vocalizing, and manipulating objects. Low attenders were engaged more in gross motor activities. Yarrow (1963)

obtained similar results with adopted infants. If these activity level studies are accurate, a high activity level may alert parents and early educators to possible TP deficits. For instance, if the findings that boys have a higher activity level than girls (Knop, 1946; Kagan and Lewis, 1965) and that Black infants have superior motor or muscle abilities during the first twelve months (Bayley, 1965) are true, problems associated with sustained attention should also be evident in these groups.

Another innate or maturation consideration is birth condition. Using Apgar Scores (measures of medically vital signs) for infants 60 seconds after birth with follow-up evaluations at 3 and 9 or 13 months, one study (Lewis, Bartels, Campbell, and Goldberg, 1967) found that boys look longer at human and light stimuli. A high Apgar Score was associated with longer total time looking and longer first looks. A low Apgar score was related to a greater number of looks at stimuli. These results imply that birth condition affects the capacity for sustained attention. They also contradict Knop's (1946) and Kagan and Lewis' (1965) findings that the ability to sustain attention is weaker in boys than girls. However, using observation and the discovery that heart deceleration is associated with sustained attention (Kagan and Rosman, 1964), Kagan and Lewis (1965) longitudinally investigated attentive behavior of 32 infants at 6 and 13 months. They found girls much more likely to sustain attention, to prefer novel stimuli, and to prefer stimulus uncertainty. Boys preferred stimulus certainty. The experimenters interpreted the results as indicating advanced maturation in girls as opposed to boys. Although inconclusive, the research strongly implies that TP differences are evident from birth. In the first year, these differences may be a

function of innate predispositions to respond to stimulation, general activity level, sexual characteristics, and birth conditions.

Developmental studies are frequently used to demonstrate the relationship of abilities and maturation. One such study (Hagen, 1969) reported that sustained attention and ability to filter out distractors increased with age through grades one, three, five, and seven. The developmental explanation of TP is also supported by the longitudinal study of 83 hyperactive children at ages two through five and 12 through 16 (Mendelson, Johnson, and Stewart, 1971). Although serious academic problems still existed upon entering adolescence, attention impairment showed marked improvement without any formal intervention programs in one-half and moderate improvement in one-fourth of the subjects. Other studies imply that TP capacities are not developed in a smooth, cumulative fashion, but develop in spurts. For example, Kagan and Moss (1962) evaluated data from the Fels Institute Study, which followed 89 Ss from birth to adolescence, and concluded that there is no relationship between TP in the first three years of life and later childhood. A later source (Mussen, Conger, and Kagan, 1969) reports that the capacity for sustained attention is greatly increased between six and seven years of age. This change was attributed to biological changes in the central nervous system reflected by growth of neural tissue and changes in electrical potentials.

Although TP research points to a genetic-maturation-persistence relationship, the information cannot be implemented in an education setting. Present educational and psychological knowledge and methodologies are too limited to permit intervention of genetic or maturational processes. However, education and psychology can tentatively identify innate variables

and consider them when making educational decisions. Therefore, educational efforts should probably concentrate on learned, independent variables which can be altered in the educational process, while simultaneously recognizing the potentially powerful influence of innate factors.

Environmental considerations

A universal finding for all ages is that novelty and stimulus variability are positively related to sustained attention (i.e., Lewis, Goldberg, and Rausch, 1967; Frankmann and Adams, 1962; Bell, 1966; Perticone, 1969; Leckart, 1967; and Leckart et al., 1970).

Kagan (1968) reported that attention is governed by contrast and movement from birth to nine weeks and by novelty and rehearsal of past associations with the stimulus from four months to two years. Kagan (1971) also found that monotony functionally reduces sustained attention time as the infant grows older.

Task difficulty has also been investigated as a form of stimulus variation (Wyler and Bednar, 1967). They reported that children 3 1/2 to six years of age persevered more on actual or alledged difficult tasks if they had previously failed on the same task and persevered more on actual or alledged easy tasks if they had previously succeeded on the same task. However, according to Leonard and Weitz (1971), task enjoyment is not related to TP.

Perceptual states of deprivation or satiation may be discussed as functions of stimulus variability or physiological states. The writer chose to consider deprivation and satiation as functions of the stimulus. Research relating these concepts to TP has been primarily conducted with college students. Using 31 Ss, one study (Leckart, Levine, Goscinski, and Brayman, 1970) found that sustained attention increased

with the time of perceptual deprivation prior to presentation of a stimulus. Leckart (1967) used 80 college undergraduates to evaluate the effects of prolonged exposure to stimuli. The more a subject observed, the shorter the time of sustained attention. He could not determine whether the reduced observation time was a function of the subjects' failure to process information as thoroughly or development of a facilitative set. In any event, sustained attention is apparently disturbed by stimulus satiation and enhanced by stimulus novelty. The research on physiological states suggests that physiological deprivation may be positively or negatively related to the capacity for sustained attention. However, in some instances, training may counteract the effects of fatigue.

The TP effects of physiological states, which are environmentally controlled, have also been investigated. In their review of the literature, Blum and Adcock (1968) concluded that physiological satiation enhances sustained attention in infants. This conclusion was replicated with 32 infants 6 weeks of age (Giacoman, 1971). Giacoman found that hunger-satiated infants attended longer than hungry infants.

A comparative study of fatigue suggests that sustained attention can be trained without loss of efficiency (Byck & Hearst, 1962). The investigators demonstrated that monkeys' quality of performance could be maintained over 120 hours of continuous work (pressing bar to avoid shock) if they were given past experience with fatigue sessions. Monkeys that had prior training sessions of 48, 72, and 120 hour duration had no significant decrement in performance across the 120 hour experimental session. Non-trained monkeys showed an initial decrement, but by the fourth and fifth days regained a response rate similar to the first day.

The following studies will evaluate the effects of other people on attention in "normal" children. Such studies are rare. Bee (1964) found that the parents of good attenders allow their children to solve tasks while parents of poor attenders solve the tasks for the children. This agrees with Mandel's (1968) finding that moderately nurturant environments promote longer TP. Studies also report early childhood Ss are more willing to choose and remain with a difficult task when working privately with a partner (Torrance, 1969) or in competition with peers (Wolf, 1938). Allen (1969) reported that fifth and sixth grade children would drop marbles in holes at a faster rate for longer periods of time for a warm supervising adult than a cold one. The warm-cold discrepancy became greater when the adult was of the opposite sex. In another study, the same experimenter (Allen, 1966) found that preschool children persist longer with adult support and evaluation while fifth graders persist longer when work fails to meet self evaluation standards. This finding suggests that preschool children rely more upon external support and feedback to continue tasks. These four studies infer the significance of others in determining the child's capacity for and utilization of TP behavior.

Task Persistence and Achievement

For many years, teachers and the lay public have associated TP with achievement and distractibility with failure. In this instance, research supports the popular view (Ryans, 1938a; Packard, 1970; Witte and Grossman, 1970; Gilmore, 1968). Persistence-achievement studies which used early or middle childhood subjects (Ss) are rarely found in the literature. Only three studies (Lahaderne, 1968; Hunter and Johnson, 1971;

Frye and Spruill, 1965) reviewed for this research used early childhood samples to investigate persistence-achievement. Lahaderne (1968) found positive correlations (range .39-.53) between persistence of sixth graders and results of the Stanford Achievement Test. Another study (Hunter and Johnson, 1971) found that disabled readers had significantly lower attention (concentration) scores than normal readers in an age group ranging from 7-11 to 11-14 years of age. In 1965, Frye and Spruill reported that task-oriented fourth graders were significantly more likely to remain during recess to complete math tasks and to demonstrate more concern about task results. Although few and inconclusive, these TP studies are representative of the literature using younger Ss in persistence achievement research.

In contrast, persistence achievement research with older, primarily college, Ss is quite extensive. One of the classic studies of this nature was conducted by Fernald (1912). His underlying purpose was to determine if achievement was a function of the ability to continue to strive for the sake of achievement. He reported that non-delinquents would stand on their toes twice as long as delinquents. The study and results were replicated several times with different non-delinquent - delinquent samples.

Numerous studies have investigated the relationship of TP to factors generally associated with academic success. Ryans (1938b) reported a correlation of .56 between persistence and study time. He (1938a) also found a correlation of .79 between persistence and grades (compared to .73 between IQ and grades) with a sample of junior college sophomores and high school seniors. In 1943, Roach selected high and low college "plodders." He reported a positive relationship between time spent on

a task and the ability to successfully complete it. In 1948 (French, 1948), the Educational Testing Service evaluated the predictive validity of persistence tests for college achievement. The tentative conclusion was that persistence is as good a predictor of college achievement as other measures. The general concensus of researchers is that TP is positively related to academic achievement with "older groups."

Although strongly suggesting that persistence and achievement are positively related, research findings do not imply that persistence is the only predictor of achievement. For instance, several studies report no relationship between persistence and intelligence (Ryans, 1939; Crutcher, 1934; Mangan, 1959; and Stewart, Pitts, and Craig, 1966). In 1938 (Ryans, 1938b), persistence-intelligence correlations reported in a review of the literature were $-.06$, $.00$, $.13$, and $-.13$. Later studies replicated these findings.

Task Persistence and Training

If TP is related to academic achievement, then a valid question is, "Can TP be taught?" The importance of this question to the present study is obvious. If TP could not be taught, then objective data would not be needed to determine whether TP should be part of an ECE curriculum.

The research uniformly answers the question in the affirmative. The underlying philosophy of most learning-oriented researchers is that high persisters probably have a history of success and payoff and, therefore, persist in the belief that success and payoff are possible. In contrast, the low persisters have a history of failure and no payoff and, consequently, fail to persist because their belief that success and payoff are not possible is confirmed after a few nonreinforced

trials. Specific techniques which have been used to increase TP are: (1) manipulation of teacher attention (Goodwin, 1966; Allen, Henke, Harris, Baer, and Reynolds, 1967; Hall, Lund, and Jackson, 1968), (2) use of prompt and symbolic reinforcers (Marshall, 1969; Spence, 1970), (3) "token economies" (Wagner and Guyer, 1971; Martin and Powers, 1966), and (4) group counseling (Hubbert, 1970). Yando and Kagan's (1968) finding that students model teacher "tempo" also implies that TP may be modified with modeling techniques. However, the literature reviewed failed to disclose any training program which systematically integrated a majority of the variables associated with TP.

Developmental Trends of Task Persistence

If the conclusions that TP is related to academic achievement and is trainable are valid, then determination of when to introduce TP training becomes an educational issue. One review of the literature (LaCrosse, Lee, Litman, Ogilvie, Stodolsky, and White, 1970) concluded that very little research on sustained attention between six months and four years of age has been attempted. Since the literature also suggests that the origin of most unsuccessful learning styles in children may be discovered in early childhood (Deutch, 1965; Taba, 1964; Riessman, 1964; and Hertzog, Birch, Thomas, and Mendez, 1968) and that the effects of deficient styles are cumulative from preschool through elementary grades (Hertzog et al., 1968; Gray and Klaus, 1968; and Bloom, 1964), evaluation of developmental characteristics of TP should be initially conducted with early childhood samples.

The first persistence studies with younger children attempted to evaluate these characteristics. The procedure used for many of these

investigations typically placed children in a free play situation with numerous toys. The dependent variable was the time spent playing with one toy. Using this procedure, Bott (1928) found that persistence was a function of age; more specifically, mean persistence times were 2.5 minutes for age two, 4.7 minutes for age three, and 5.6 minutes for age four Ss. Absolute time spent with toys varied with other studies, but the developmental trends were replicated. For example, VanAlstyne (1932) found mean play-times for 112 preschool children to be seven minutes for age two, 8.9 minutes for age three, 12.3 minutes for age four, and 13.6 minutes for age five; Gutteridge (1935) reported mean playtimes of 9.4 minutes for age five. Herring and Kock (1930) reported 1 1/2 - 2 1/2 minutes of play persistence for two and four-year olds. Cockrell (1935) found that the average maximum attention span for six preschool children playing with clay, crayons, and blocks was about five minutes. In Ryans' review of the literature (1939), he concluded that persistence increases with age until adolescence. In more recent investigations, Moyer and Gilmer (1954; 1955) questioned these findings because children demonstrated no systematic increase of persistence behavior when playing with his toys which were experimentally designed to hold attention. His mean persistence times for 381 boys and girls from ages eighteen months to seven years was 15 to 40 minutes, depending on which of four toys was presented. However, his method presented one toy at a time in a room that was controlled to eliminate distracting stimulation. These modifications in procedure make the equivalence of results questionable. In any event, the evidence for a developmental explanation of persistence is strong. However, the research reviewed is based on play situations. The present study is concerned with TP in "natural"

work situations, which is not mentioned in the literature. If equivalent results are obtained with work tasks, then implementation of a TP program as early as age two seems reasonable.

Task Persistence and Sex

Of course, special needs of individuals and groups must always be considered. Therefore, the formulation of ECE programs must include consideration of the special needs of the target population. For example, should the ECE specialist provide for different TP experiences for boys and girls? The following results suggest that girls are more persistent than boys. Kagan and Lewis (1965) found girls six and 13 months of age have longer periods of sustained attention than boys. In a study of 400 fifth to eighth grade children (Hartshorne, May, and Maller, 1929), girls were more persistent in distracting situations; otherwise, there were no significant differences. In a discrimination task (identifying letters of alphabet), educationally disadvantaged girls were more persistent than other groups (Beckman, 1967). Zunich (1964) found that girls made more individual efforts and sought help and information more frequently on puzzle-solving tasks than boys. Nakamura and Ellis (1964) reported that teachers rated 14 girls more persistent than 14 boys and that girls are more persistent for large rewards.

On the other hand, numerous studies cite males as more persistent. Males were reported to be more persistent on insoluble finger maze tasks (Schofield, 1943) and a series of visual motor tasks (i.e., puzzles, nuts and bolts, etc.) (Crutcher, 1934). Distefano (1969) reported that males are more task oriented than females at all ages. He also found a significant relationship between task persistence and being task

oriented. With similar conclusions, Bass (1967) reported that task-oriented subjects are more likely to complete a task when free to quit. This agreed with a study (McManis, 1965) that found fifth and sixth grade boys persisted more after pursuit-rotor tasks were terminated. In a study comparing children three to five years of age and six to eight years of age, Crandall and Robson (1960) found no significant sexual differences on persistence after failure or success at the younger ages, but boys continued failed tasks significantly more in the older group. Crandall and Robson's findings are corroborated by Lewis' (1965) conclusion from reviewing the literature that, with age, boys progressively preferred more difficult goals than girls.

Other studies have reported no significant differences between groups. In 1939 Ryans reviewed the literature and concluded that sexual differences in persistence did not exist. In 1962 McClintock did a factor analytic study of persistence and also found no significant sexual differences. Turnure (1966) and Roth (1966) reported no sexual differences with distractibility. Although a few studies found no significant differences between the TP of boys and girls, the overall profile of research findings are inconclusive. The evidence suggests that TP experiences may be more valuable if they are differentially planned for boys and girls.

Task Persistence and Social Advantage

Professionals concerned with education have long recognized that the academic performance and achievement of socially disadvantaged groups are generally inferior to socially advantaged Whites (Havighurst

and Breese, 1947; Hertzog, Birch, Thomas and Mendez, 1968; Shuey, 1968; Fleishman, 1969). However, studies directly investigating the relationship of advantaged and disadvantaged groups to persistence are scarce. If such social differences exist, they should be identified and considered in the curriculum planning of ECE. The following group of studies report significant social advantage differences in TP.

Cazden (1968) stated that the outstanding characteristic of the disadvantaged is a "short attention span." Roth (1966) reported that "culturally restricted" fifth and sixth graders are distracted more on math problems by irrelevant stimuli and make progressively more errors as more stimuli are presented. In contrast, Beckman (1967) found educationally disadvantaged third and fifth grade girls to be less distractible on a discrimination task concerned with letters of the alphabet than other groups.

Bass' (1967) review of the literature with older Ss supports the position that social advantage is related to TP behavior. He concluded that college graduates and white collar workers are more task oriented than less educated or blue collar workers. Relating this finding to Distefano's (1969) results previously discussed on page 14, these two groups should also be more persistent.

Another group of studies reported no significant TP differences between groups with different socially advantaged backgrounds. In his factor analytic study, McClintock (1962) found no relationship between socio economic status (SES) and persistence. Fisher (1968) found no significant difference between groups on reflectivity measured by the Conceptual Styles Test for three groups (lower and middle class, White and Black, girls and boys). Cushing (1929) found no significant

differences between attention span (dropping marbles in a box) and SES of preschool children. However, his questionable SES criterion was comparing university day nursery and public day nursery samples.

The research fails to clearly establish the relationship between TP and social advantage. The early childhood educator with a homogeneous student population could benefit from this information.

Task Persistence and Ethnic Groups

Although ethnic and social variables may be treated as functionally independent factors in school achievement (Lesser, Fifer, and Clark, 1965), in reality race and degree of social advantage frequently interact, as reflected by the overwhelming proportion of certain non-White groups in lower-class working, economic, and social status (Havighurst, 1964). Therefore, when programs are considered for children with a "high risk" of educational failure or underachievement, concern is typically directed toward groups in which the interaction of race and educationally handicapping experiences is evident. Only one study in this review of the literature investigated the TP-ethnic relationship. Roth (1966) found no significant ethnic differences for the distractibility of fifth and sixth graders working math problems. Obviously, the research in this field needs to be expanded.

Task Persistence and Personality and Ability Variables

Although not directly related to TP, a review of abilities and personality characteristics, which appear to be associated with persistence of different ethnic and advantaged groups may be of value.

Many lay people and teachers believe attitude toward school is closely related to achievement. However, several recent studies (i.e., Jackson and Lahaderne, 1967; and Lahaderne, 1968) have failed to find a significant relationship between attitudes and achievement, intelligence, or attention. If these findings are valid, attempts to develop "proper" academic attitudes in preschool should be secondary to development of other skills more directly related to achievement, such as persistence. However, other attitudes have been investigated which appear to be related to TP. For example, Currie (1967) found no significant difference in value orientations toward success of middle and lower class, Black and White parents and children. However, middle class Blacks and Whites were future oriented while lower class Blacks and Whites were present oriented. LaSorte's (1967) findings with college freshmen were similar, with middle class also differentiated by a belief that the future is manipulable and a function of achievement. Lower class people are more prone to believe that the future is ordained and a matter of chance. Tedeschi and Levy (1971) reported that lower class Black fifth and sixth grade children are more externally controlled than middle class White fifth and sixth graders. Externally controlled Ss preferred chance tasks; internally controlled Ss preferred skill tasks. These characteristics may affect persistence because continued effort seems to imply a belief that current behavior can modify and control future events. Without this attitude, one would probably tend to approach a task with a "what-will-be-will-be" attitude. In 1968 Smith investigated teenagers' attitudes toward work. He found that middle class teenagers view work in terms of cost (effort, pressure, strain), while lower class teenagers view work as instrumental to

achieving specific goals. This implies that persistent work for lower class may be a function of tangible, contiguous, external goals, while more subjective consequences govern TP in middle class Ss.

In a study (Crutcher, 1934) of 83 Ss from 7 to 16 years of age, the quietest and most withdrawn children persisted significantly longer than more active children. This finding was supported by a longitudinal study (Wilson, Brown, and Matheny, 1971) of 232 same sex twins during 3 to 36 months of age. The twin with the most frequent temper tantrums and demands for attention had the shortest periods of sustained attention. The personality studies reviewed show promise of relating personality variables to persistence behavior and, also, differentiating social class or ethnic differences.

The nature of ability differences associated with ethnic groups and social class are reviewed below. Burnes (1969) compared test behavior of upper middle class Blacks and Whites with lower class Blacks and Whites. He found the differences to be primarily a function of socio-economic status favoring middle class, with Blacks generally less concerned about their performance. Ability configurations were similar, with differences reflected by amplitude of profiles. In contrast, Lesser, Fifer, and Clark (1965) found different patterns of abilities for Chinese, Jewish, Negro, and Puerto Rican children with social class only affecting amplitude of profiles.

Conclusions

The review of the literature uniformly agrees that persistence and academic achievement are closely related and that persistence can be taught. These findings suggest that TP should be a consideration in

curriculum development. However, the literature provides conflicting data on the following TP considerations: (1) developmental trends, (2) sexual differences, (3) social advantage-disadvantage differences, and (4) ethnic group differences. These inconsistent findings need to be resolved to help educators decide if TP should be part of a curriculum and, if so, when and for what groups TP is appropriate.

METHOD

Purpose and Objectives

The inconclusive nature of research data on TP in early childhood, especially in work situations, was indicated in the review of the literature. The need now exists to expand the research data base to permit more valid conclusions and generalizations. This study attempted to partially satisfy this need by: (1) investigating the developmental aspects of TP in an early childhood "work" situation and (2) identifying TP differences, if any, between age levels, ethnic groups, sexual groups, and social groups.

More specifically, the goals of the study were to generate data to determine whether TP can be differentiated by (1) age groups two, four, and six, (2) ethnic groups (Black and White), (3) male-female groups, or (4) socially advantaged-disadvantaged groups. It was anticipated that if significant differences between groups were identified, the results might be valuable curriculum considerations in ECE. For example, if disadvantaged White children are less TP than other groups, the ECE programs for disadvantaged Whites might emphasize TP training more than programs for other groups.

TP behavior was investigated in terms of four dependent variables: (1) total time (in minutes) spent working on a task, (2) whether the task was completed (CT) or not, (3) total time (in minutes) away from the task, and (4) total number of times distracted from the task. The total time spent on the task and number of completed tasks were

assumed to be direct measures of TP. The total time away from the tasks and total number of times distracted from the tasks were assumed to be inverse measures of TP.

The following hypotheses were offered to statistically evaluate the objectives:

- Hypothesis 1: Four year old children will show significantly (longer total time on task; more CT; less time away from tasks; less times distracted from task) than two year old children.
- Hypothesis 2: Six year old children will show significantly (longer total time on task; more CT; less time away from tasks; less times distracted from task) than four year old children.
- Hypothesis 3: Six year old children will show significantly (longer total task time; more CT; less time away from tasks; less times distracted from task) than two year old children.
- Hypothesis 4: White preschool children will show significantly (longer total task time; more CT; less time away from tasks; less times distracted from task) than Black preschool children.
- Hypothesis 5: Female preschool children will show significantly (longer total time on task; more CT; less time away from tasks; less times distracted from task) than male preschool children.

Hypothesis 6: Advantaged preschool children will show significantly (longer total time on task; more CT; less time away from tasks; less times distracted from task) than disadvantaged preschool children.

Population and Sample

Population

The target population was two, four and six year-old, Black and White, male and female, advantaged and disadvantaged children enrolled in formal ECE programs in central Arkansas. The ratio of Black to White population in central Arkansas is approximately even.

Sample

The 120 subjects (Ss) were selected from ECE programs which met the standards set forth in "Guidelines for the Development of Early Childhood Programs in Arkansas." The sample was stratified according to age, race, sex, and social advantage (Tables 1, 2, 3 and 4 on pages 24 and 25).

The criteria for assignment to age groups was the following "year-month" classifications: (1) 2-00 to 2-11, (2) 4-00 to 4-11, and (3) 6-00 to 6-11.

Ss were classified as advantaged if (1) at least one parent had formal education beyond high school, (2) the combined family income exceeded \$10,000, and (3) the child attended a private ECE program. Advantaged White Ss were selected from a private ECE program in Little Rock, Arkansas. Advantaged Black Ss were selected from private ECE programs in Pine Bluff, Arkansas.

Ss were classified disadvantaged if (1) neither parent had post-high school education, (2) the combined family income did not exceed OEO poverty guidelines by more than \$1,000.00 (Kunz and Moyer, 1969), and (3) the child attended a public ECE program which was primarily designed to serve the disadvantaged. Disadvantaged Ss were selected from a publically supported experimental program for early development and education in Little Rock, Arkansas.

Design

A "stitutional testing" task (folding clothes) to evaluate TP behavior was introduced to each subject. The results were used to compare the TP behavior of groups of children who were formally enrolled in ECE programs in central Arkansas. TP behavior of the groups were compared according to (1) age, (2) race, (3) sex, and (4) social advantage.

Table 1. Black subjects

	Age		
	2	4	6
Advantaged	10	10	10
Disadvantaged	10	10	10

Table 2. White subjects

	Age		
	2	4	6
Advantaged	10	10	10
Disadvantaged	10	10	10

Table 3. Black subjects

	Age		
	2	4	6
Male (Adv.)	5	6	5
Male (Disadv.)	3	5	5
Female (Adv.)	5	4	5
Female (Disadv.)	7	5	5

Table 4. White subjects

	Age		
	2	4	6
Male (Adv.)	5	5	6
Male (Disadv.)	4	5	4
Female (Adv.)	5	5	4
Female (Disadv.)	6	5	6

Experimental Procedure

Task selection

It was necessary to select an appropriate, "natural" work task for two, four, and six year old children. The selection of the task was determined by randomly interviewing ten mothers who lived in three buildings of the Utah State University married housing complex. The interview was one question, "What work would you use for two, four, and six year old children in your home? Give me as many ideas as you can." Numerous replies were obtained, but folding and sorting clothes were the only tasks mentioned by all of the mothers. Based on the unanimity and logic of the mothers' choices, folding and sorting clothes were selected as the "natural" work tasks for this study.

The finalized form of the task was folding and sorting 33 items of clothing and linen (Table 5). The articles were presented in a plastic basket, folded, and then, sorted according to whether the article belonged to a family member or would go in one of two rooms. To facilitate sorting, 12 x 18 inch human figure and room drawings were introduced (Figure 1). Human figure drawings represented the child's ethnic origin. The task was considered complete when the basket was emptied.

The pilot group

A pilot group of 12 White Ss was then investigated as a preliminary evaluation of experimental procedures. The Ss were children of college students living in Utah State University family housing.

Qualitative results of the pilot study led to several modifications of the main study. The following changes were made: (1)

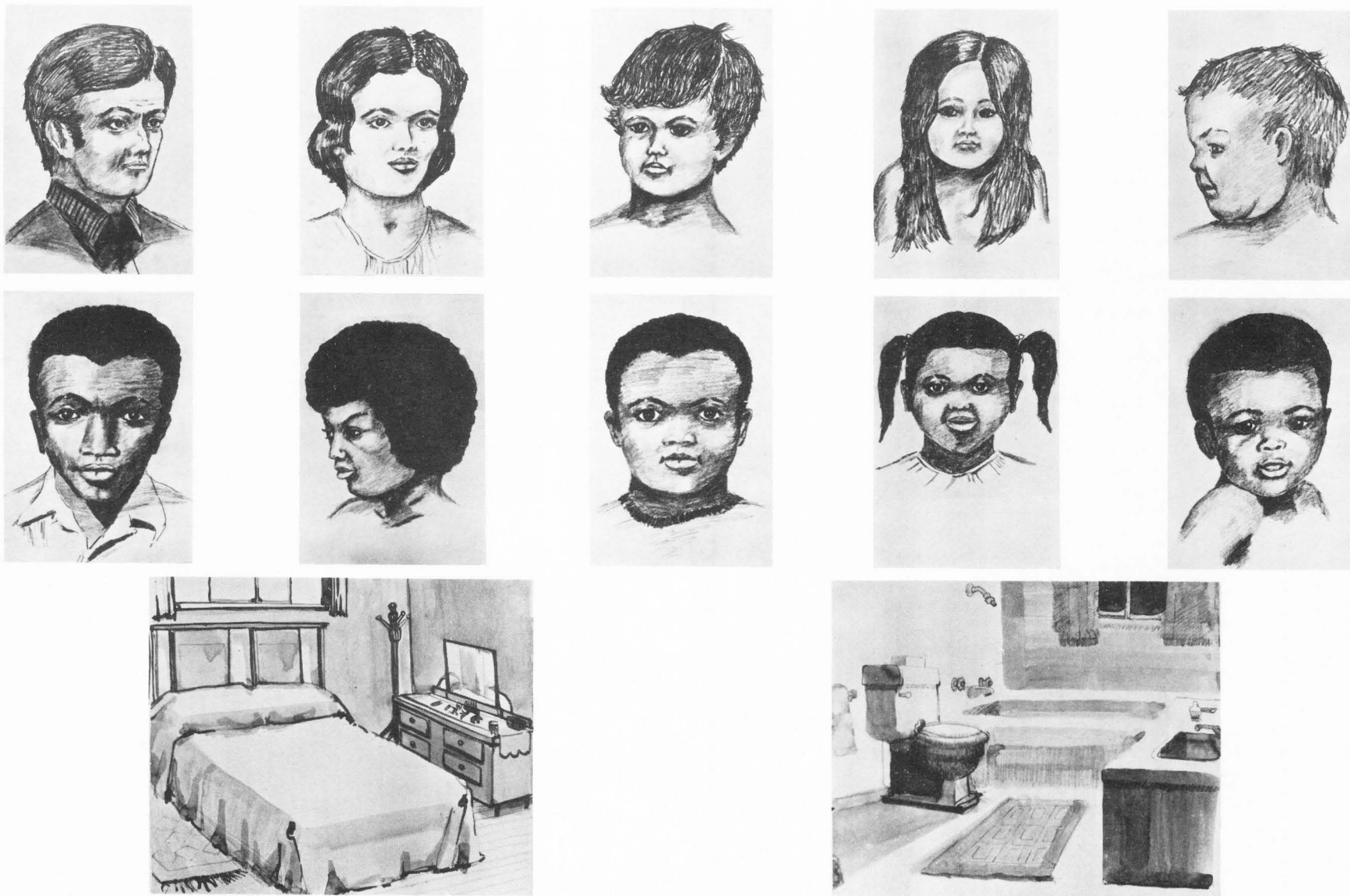


Figure 1. Human figure and room drawings presented to subjects.

Table 5. Items of clothing and linen

Man	Woman	Male Child	Female Child	Infant	Bedroom	Bathroom
Socks	Hose	Socks	Knee Socks	Diaper	Sheet	Wash Cloth
Briefs	Panties	Jeans	Dress	Booties	Pillow Case	Towel
Shirt	Bra	Shirt	Panties	Gown		
Tie	Slip	Briefs	Slip	Socks		
T-shirt	Dress	T-shirt	Hair Ribbon	Dress		
Slacks	Skirt					
	Blouse					
	Gown					

instructions were made simpler and more concrete, (2) an athletic supporter, dish towel, and dish rag were eliminated because these objects were not identified by any of the pilot Ss and (3) all verbalizations were recorded. The Ss' verbalizations during task performance were interesting and entertaining. The E decided to record all verbalizations of the children while they worked. The E's personal interests dictated this decision more than any scientific hypothesis.

A major change was the decision to collect data without videotapes. The original data collection plan was to videotape experimental sessions. However, after evaluating the pilot group procedure, the E concluded that the plan was not economical in terms of time or money. To verify that accuracy of data collection could be maintained without videotaping, three judges were trained to evaluate the dependent variables and take verbatim records of verbalizations. Then, five Ss were videotaped as they completed the experimental task. The five Ss were evaluated on all the dependent variables and a verbatim report of all verbalizations was maintained. The judges' data were obtained from videotape; the E's data were derived from personal observation during the experimental sessions. The protocols of the judges and E were in total agreement on all dependent variables and verbalizations. Therefore, the plan for videotaping was abandoned for the more economical and equally effective technique of personal observation.

The quantitative results of the Pilot Group's performance were not significant (Tables 6, 7, and 8; Figure 2). An analysis of task completion was not conducted because three of four Ss completed the

the task at ages two and four and all four Ss completed the task at age six.

Table 6. Total time on task (means)

Ss	Age			Total
	2	4	6	
Male	10.17	8.75	18.24	12.42
Female	14.83	12.75	24.00	17.25
Total	12.58	10.75	21.34	14.86

Table 7. Analysis of variance: Total time on task (age)

Source	SS	df	ms	F
Total	610.20	11		
Sex	67.74	1	67.74	1.25 ns
Error	542.46	10	54.25	

Table 8. Analysis of variance: Total time on task (sex)

Source	SS	df	ms	F
Total	610.20	11		
Sex	67.74	1	67.74	1.25 ns
Error	542.46	10	54.25	

$$F_{.05} (1,11) = 4.84$$

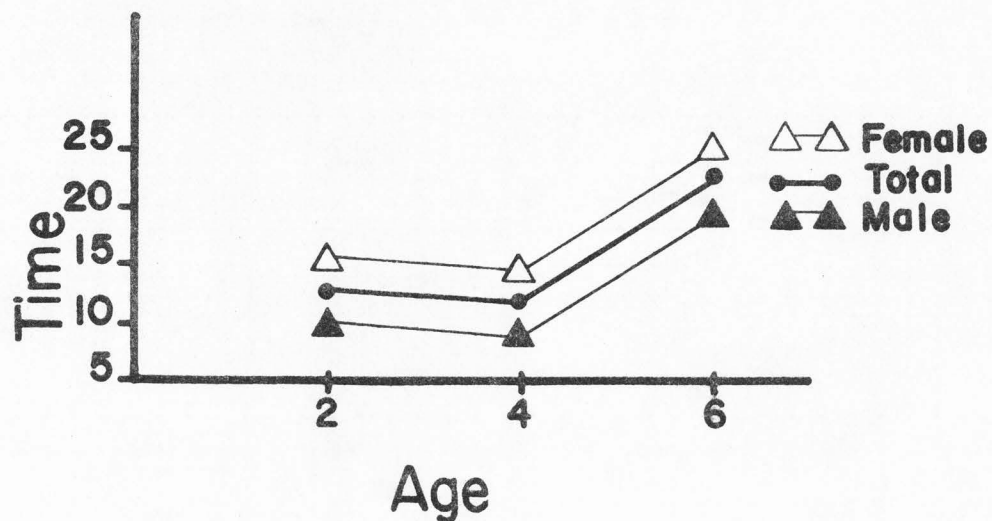


Figure 2. Mean time spent on task for pilot group subjects.

The experimental sessions

The procedures used by studies of persistence in the 1920's and 1930's were adapted for this study (i.e., Bott, 1928; VanAlstyne, 1932; Gutteridge, 1935). The task was presented in a naturalistic setting. Toys, peers, and other "natural" distractors were available in the same room or within view. Two exceptions to this procedure were required. First, siblings had to be removed from the experimental setting because they completely disrupted work (experimental) behavior of the experimental Ss. The non-experimental siblings made frequent, derogatory remarks such as "you're dumb!", "you're not doing that right," "that's not good!", etc. Similar remarks from peers did not appear to disrupt work behavior to the same excessive degree. Secondly, disadvantaged six year olds were evaluated in the school hallway because teachers would not permit the study to be conducted in the classrooms.

Each child was introduced by his teacher to the experimenter (E). The teacher said, "This is Mr. X; he needs help with some work. Will you help him?" The E then introduced materials for the task. The child was told, "I have some work that needs to be done. The work is folding these clothes (indicating basket of clothes). The clothes belong to this family. Who is this in the family (indicating adult male drawing)?" After the child's reply, the E answered, "Yes, that's the ____ (daddy, grandfather, man, etc.)" The same procedure was followed for pictures of the adult female, male child (brother), female child (sister), and infant (baby). Each child was informed that the female infant had short hair because she was a baby. Then, the child was told that some items belonged to rooms rather than people. The same procedure used to identify and confirm family pictures was used for the bedroom and bathroom pictures.

After introduction to the materials, the task activities were introduced. The child was asked, "Who do these (male child's blue jeans) belong to? Good. Can you fold them and give them to the boy? Now, do the same for this (female child's dress). And this (wash cloth)." The quality of sorting and folding was not assessed for this study. However, if the child failed to understand ownership or folding, additional demonstration trials were given. After understanding was demonstrated by the child, he was asked, "Now, can you do all of these (pointing to clothes) for me? I have some other work to do while you fold clothes. Is that alright?" Then, the E withdrew a few feet from the child and began writing. During task performance no reinforcement was given unless requested by the child. The E replied, "You can do it," to the first request for help on an item. Subsequent requests

for assistance were responded to in a normal fashion (i.e., compliance).

Criteria for terminating the session were (1) completion of the task, (2) working on the task 45 minutes, or (3) being away from the task 3 minutes (i.e., Cushing, 1929; Crutcher, 1934; Moyer and Gilmer, 1954, 1955).

Data collection

As previously defined (page 2) TP is the voluntary continuation of goal oriented behavior despite fatigue, discouragement, or distractions. For this study, TP was measured in terms of the (1) total time spent on the task, (2) total time away from the task, (3) number of times away from the task, and (4) number of tasks completed.

"Total time on task" was used as a direct measurement of TP. "Total time away from the task" was used as an inverse measurement of TP. Time was measured by two stop watches. One watch was used to time the period from when a child first picked up an article of clothing or linen to when the task was terminated. The second watch was used to measure the total time spent away from the task. To obtain the total time on task, the time recorded on the second watch was subtracted from the time recorded on the first watch.

One indirect measure of TP was whether a task was completed. Another indirect measure of TP was the number of times the child was distracted from the task. This dependent variable was considered to be an inverse measure of TP. Behaviors counted as "away from the task" were (1) watching other environmental events, (2) physically leaving the task, or (3) staring at the task without working for longer than five seconds.

RESULTS

Original Study

Introduction

All hypotheses except those concerned with completion of tasks were assessed with a three (age) x two (race) x two (sex) x two (social advantage) way analysis of variance (ANOV). The dependent variables were (1) total time on task, (2) total time away from task, and (3) number of times away from task. Since there were three age levels in the study, a Scheffe's Multiple Comparison Test was computed when a significant main effect concerning age was determined. This additional computation was necessary to determine between which levels of the independent variable (age) the significance could be attributed.

The statistical design does not assume additivity of the petitioned components of variance. Also, some rounding errors will affect the numbers reported in variance tables. Variance associated with interaction levels beyond two-way interactions were not computed because more complex interactions are not interpretable. Therefore, the components of variance reported in the ANOV tables will not necessarily sum to the total variance.

The hypotheses concerned with the completion of tasks were evaluated with Chi Square. This statistic was necessary because completion of task was evaluated in terms of "yes" or "no". Since the dependent variable is dichotomous, the normality assumption needed for an ANOV could not be met.

In order to reject the null hypotheses, the .05 level of significance was required.

Major subheadings for the presentation of results will be according to the dependent variables. Under each subheading, results for each independent variable will be presented in the following order: (1) age, (2) race, (3) sex, and (4) social advantage.

Time on task

Total time on task significantly differentiated age groups ($F = 19.47$; $p < .01$) (Table 9; Figure 3). A Scheffe's Multiple Comparison Test was computed for total time on task (Table 10) to determine between which age levels significant differences could be attributed. Total time spent on task was significantly greater at age four than age two ($F' = 8.18$; $p < .01$) and at age six than age four ($F' = 7.56$; $p < .01$).

Black Ss spent significantly more time on tasks than White Ss ($F = 14.57$; $p < .01$) (Table 9; Figure 3).

No significant sexual differences were found on the total time spent on a task (Table 9; Figure 3).

The advantaged children spent significantly more total time on task than disadvantaged children ($F = 29.56$; $p < .01$).

Time away from task

A significant age difference was obtained for total time away from the task. ($F = 13.84$; $p < .01$) (Table 11; Figure 4). A Scheffe's Multiple Comparison Test was computed for total time away from the task to determine between which age levels significant differences could be attributed (Table 12). Total time away from the task was

significantly less at age four than age two ($F' = 7.56$; $p < .01$) and at age six than age four ($F' = 5.06$; $p < .05$).

Table 9. Analysis of variance: Total time on task

Source	SS	df	ms	F
Age (A)	960.53	2	480.26	19.47**
Race (B)	359.50	1	359.50	14.57**
Sex (C)	.01	1	.01	.00ns
Social Class (D)	729.20	1	729.20	29.56**
AxB	45.13	2	22.56	.91 ns
AxC	30.78	2	15.39	.62 ns
AxD	33.35	2	16.67	.68 ns
BxC	1.61	1	1.61	.07 ns
BxD	18.46	1	18.46	.75 ns
CxD	33.52	1	33.52	1.36 ns
Error	2590.35	105	24.67	
Total	4812.36	119		

*F .05 (1,100) = 3.94

*F .05 (2,100) = 3.09

**F .01 (1,100) = 6.90

**F .01 (2,100) = 4.82

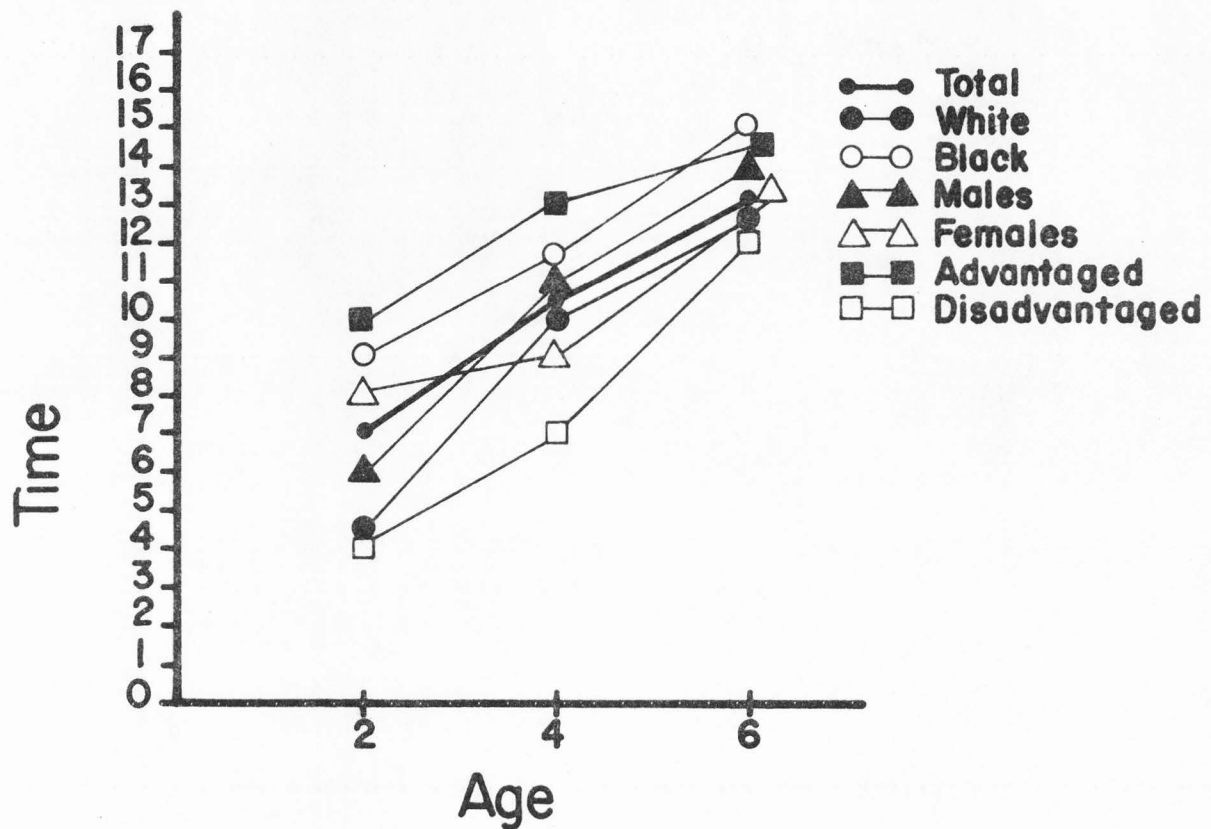


Figure 3. Mean total time (minutes) spent on task at ages 2, 4 and 6 for four groups (total group, race, sex, and social class)

Table 10. Scheffe's Multiple Comparison Test: F-ratios for total time on task

Age	Age	
	4	6
2	8.18**	
4		11.63**

*F .05 = 3.94
 **F .01 = 6.90

Table 11. Analysis of variance - Total time away from the task

Source	SS	df	ms	F
Age (A)	51.16	2	25.58	13.84**
Race (B)	8.32	1	8.32	4.50*
Sex (C)	.83	1	.83	.45 ns
Social Class (D)	8.57	1	8.57	4.64*
AxB	4.68	2	2.34	1.27 ns
AxC	10.87	2	5.43	2.94 ns
AxD	5.45	2	2.72	1.47 ns
BxC	.01	1	.01	.00 ns
BxD	.57	1	.57	.31 ns
CxD	.25	1	.25	.14 ns
Error	194.25	105	1.85	
Total	284.41	119	2.39	

*F .05 (1,100) = 3.90

*F .05 (2,100) = 3.09

**F .01 (1,100) = 6.90

**F .01 (2,100) = 4.82

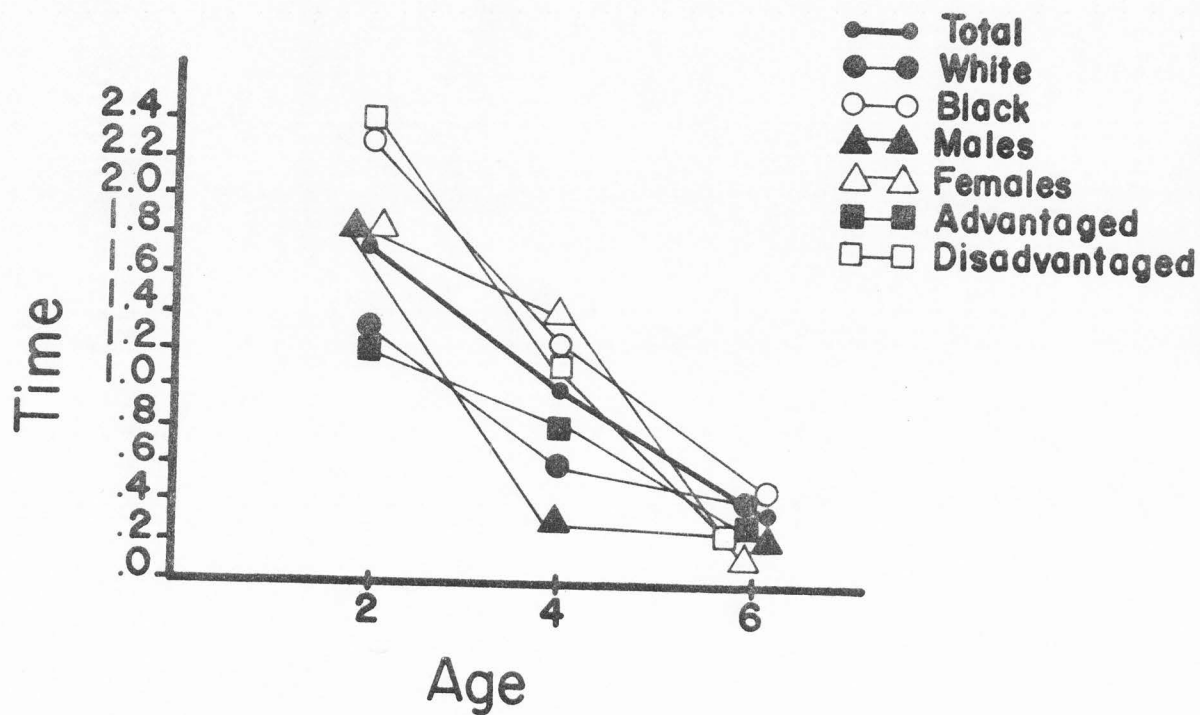


Figure 4. Mean total time (minutes) away from the task at ages 2, 4, and 6 for four groups (total group, race, sex, and social class)

Table 12. Scheffe's Multiple Comparison Test: F-ratios for total time away from the task

Age	Age	
	4	6
2	7.56**	
4		5.06*

*F' .05 = 3.94
 **F' .01 = 6.90

Black Ss spent more time away from tasks than White Ss ($F = 4.50$; $p < .05$) (Table 11; Figure 4).

No significant sexual differences were found for the total time away from the task (Table 11; Figure 4).

The advantaged children spent significantly less total time away from the task than disadvantaged children ($F = 4.64$; $p < .05$) (Table 11; Figure 4).

Number of completed tasks

A significant age difference was obtained for the number of completed tasks ($X^2 = 12.74$; $p < .002$) (Table 13; Figure 5). Inspection of Figure 5 and the Chi Square Table (Table 13) suggested six year olds completed significantly more tasks than two or four year olds. Completion of tasks did not significantly differentiate two and four year olds.

Table 13. Chi square: Completion of task at ages 2, 4, and 6.

	Count	Age			Row Total
		2	4	6	
Task Completed	Yes	21	23	35	79
		26.6	29.1	44.3	65.8
		52.5	57.5	87.5	
		17.5	19.2	29.2	
Task Completed	No	19	17	5	41
		46.3	41.5	12.2	34.2
		47.5	42.5	12.5	
		15.8	14.2	4.2	
Column Total	40	40	40	120	
Total	33.3	33.3	33.3	100.2	

$$X^2 = 12.74; df = 2; p < .002; \text{Contingency Coefficient} = .31$$

There were no significant differences between Black and White children for the number of tasks completed. (Table 14).

Table 14. Chi square: Completion of tasks by Black and White subjects

	Count Row % Col % Tot %	White	Black	Row Total
Yes		41 51.9 68.3 34.2	38 48.1 63.3 31.7	79 65.8
No		19 46.3 31.7 15.8	22 53.7 36.7 18.3	41 34.2
Column Total		60 50.0	60 50.0	120 100.0

$X^2 = .15$; $df = 1$; $p < .44$; Contingency Coefficient = .05

Males completed significantly more tasks than females ($X^2 = 5.92$; $p < .009$) (Table 15; Figure 5). Inspection of Figure 5 indicates that the significance is probably due to differences at ages two and four, with the greatest discrepancy found at age four. The differences at age six are negligible.

Table 15. Chi square: Completion of tasks by male and female subjects

	Count	Male	Female	Row Total
	Row %			
	Col %			
	Tot %	1	2	
Yes		45 57.0 77.6 37.5	34 43.0 54.8 28.3	79 65.8
No		13 31.7 22.4 10.8	28 68.3 45.2 23.3	41 34.2
Column Total		58 48.3	62 51.7	120 100.0

$$X^2 = 5.92; df = 1; p < .009; \text{Contingency Coefficient} = .23$$

Advantaged children completed significantly more tasks than disadvantaged children ($X^2 = 3.70; p < .04$) (Table 16; Figure 5). Inspection of Figure 5 indicates that, as with sex, the differences are apparently attributable to differences occurring at ages two and four.

Table 16. Chi square: Completion of tasks by advantaged and disadvantaged subjects

	Count	Advantaged	Disadvantaged	Row Total
	Row%			
	Col%			
	Tot%			
Yes	45	34	79	
	57.0	43.0	65.8	
	75.0	56.7		
	37.5	28.3		
No	15	26	41	
	36.6	63.4	34.2	
	25.0	43.3		
	12.5	21.7		
Column Total	60	60	120	
	50.0	50.0	100.0	

$\chi^2 = 3.70$; $df = 1$; $p < .04$; Contingency Coefficient = .19

Number of times away from task

No significant differences for the number of times away from the task were obtained for age, race, sex, or social advantage groups (Table 17).

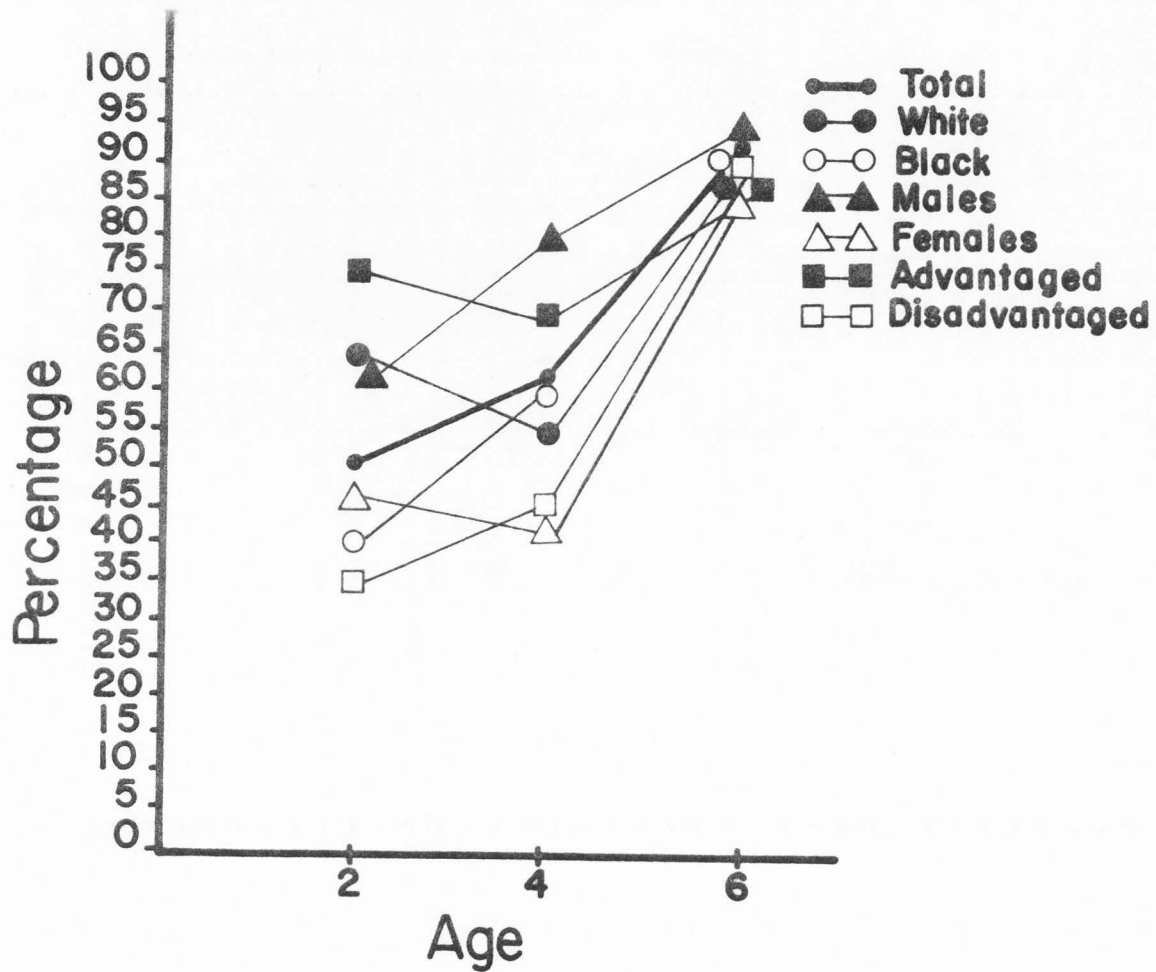


Figure 5. Percent of subjects completing task at ages 2, 4, and 6 for four groups (total group, race, sex, and social class)

Table 17. Analysis of variance: Number of times away from the task

Source	SS	df	ms	F
Age (A)	41.82	2	20.91	.09 ns
Race (B)	.77	1	.77	.35 ns
Sex (C)	.15	1	.15	.07 ns
Social Class (D)	5.07	1	5.07	2.30 ns
AxB	2.15	2	1.08	.49 ns
AxC	2.93	2	1.47	.67 ns
AxD	1.76	2	.88	.40 ns
BxC	7.88	1	7.88	3.58 ns
BxD	3.86	1	3.86	1.75 ns
CxD	.33	1	.33	.15 ns
Error	231.00	105	2.20	
Total	296.31	119	2.49	

*F. .05 (1,100) = 3.94

*F .05 (2,100) = 3.09

Summary

Significant developmental trends were found for (1) total time on task, (2) total time away from tasks, and (3) completed tasks. Total time on task across ages two, four, and six had a positive linear relationship. Total time away from tasks over ages two, four, and six had a negative linear relationship. Six year old children completed significantly more tasks than two or four year olds. Six year olds were not significantly differentiated by race, sex, or social class.

No significant differences in the number of tasks completed by two and four year olds were noted. The number of times away from task failed to produce any significant results.

Black Ss spent significantly more time on tasks and away from tasks than White Ss. Ethnic differences did not significantly differentiate the number of times away from tasks and the number of completed tasks.

Males completed significantly more tasks than females. Total time on task, total time away from task, and number of times away from task did not significantly differentiate male and female Ss.

Advantaged children completed significantly more tasks and spent significantly more time on task and less time away from tasks than disadvantaged children. The number of times away from task did not significantly differentiate social class group.

Extended Study

Introduction

One major extension of the study was the decision to record all verbalizations. The verbalizations were then classified as either task relevant or task irrelevant. A verbalization would be considered task relevant if the child (1) asked for assistance with some aspect of the task, (2) asked for assurance that his performance was adequate, (3) related the task to his past experience (i.e., "I fold clothes like these at home."), (4) made comments about the difficulty level of the task, (5) identified items and/or the people to whom items belonged (i.e., "This is a towel; it belongs to the bathroom."), (6) verbalized the process of sorting and folding clothes. Verbalizations which were not related to task performance were considered task irrelevant.

Another major extension was the computation of proportion tables for the number of Ss at ages two, four, and six who completed the tasks according to three criteria considered simultaneously: (1) race, (2) social advantage, and (3) sex. The writer believed that the tables of proportions would petition the groups further than the original study and, therefore, provide more meaningful interpretations.

The third extension of the study was the computation of inter-correlations among all variables investigated by ANOV. This correlation matrix was computed because it was part of the "packaged" computer program for the ANOV. Therefore, the writer chose to use the information in the present study.

Verbalizations--Introduction

Verbalizations were assessed with a three (age) x two (race) x two (sex) x two (social advantage) way analysis of variance. The dependent variables were each subject's (1) number of task relevant verbalizations, (2) number of task irrelevant verbalizations, and (3) total number of verbalizations. Since there are three age levels in the study, a Scheffe's Multiple Comparison Test was computed when a significant main effect concerning age was found. This additional computation was necessary to determine between which levels of the independent variable (age) the significance could be attributed.

The statistical design does not assume additivity of the petitioned components of variance. Also, some rounding errors will affect the numbers reported in variance tables. Variance associated with interaction levels beyond 2-way Interactions were not computed because more complex interactions are not interpretable. Therefore, the components of variance will not necessarily sum to the total variance.

In order to reject the null hypothesis, the .05 level of significance was required.

Major subheadings for the presentation of results will be in terms of the dependent variables. Under each subheading, results for each independent variable will be reported in the following order: (1) age, (2) race, (3) sex, and (4) social advantage.

Task relevant verbalizations

A significant age difference was found for the number of task relevant verbalizations ($F = 4.55$; $p < .05$) (Table 18; Figure 6). A

Scheffe's Multiple Comparison Test was computed to determine between which age levels the significance could be attributed. There were significantly more task relevant verbalizations at ages four and six than at age two ($F' = 8.07$; $p < .01$) (Table 19). However, no significant differences were noted between ages four and six for the task relevant verbalizations.

White Ss used significantly more task relevant verbalizations than Black Ss ($F = 9.16$; $p < .01$) (Table 18; Figure 6).

No significant differences in the number of task relevant verbalizations were found in relation to the sex variable (Table 18; Figure 6). However, a significant interaction between age and sex was obtained ($F = 6.48$; $p < .01$) (Table 18; Figures 6 and 7). Inspection of Figures 6 and 7 indicated that females utter more task relevant verbalizations at age two and four than males. However, at age six, males use more task relevant verbalizations. Also, the verbalizations of males increased in a positive, linear fashion from age two to age six. In contrast, females increased their verbalizations from age two to age four, but at age six the frequency of verbalizations decreased.

Social class was not significantly differentiated by the number of task relevant verbalizations (Table 18; Figure 6). However, inspection of Figure 6 suggests a "cumulative deficit" trend.

A significant interaction between race and social class was found on the task relevant verbalization variable ($F = 5.47$; $p < .05$) (Table 18; Figure 8). White Ss used more task relevant verbalizations than Black Ss. Interestingly, advantaged White children used more task relevant verbalizations than disadvantaged White children, while

disadvantaged Black children used more task relevant verbalizations than advantaged Black children.

Table 18. Analysis of variance: Number of task relevant verbalizations

Source	SS	df	ms	F
Age (A)	503.38	2	251.69	4.55*
Race (B)	506.77	1	506.77	9.16**
Sex (C)	60.95	1	60.95	1.10 ns
Social Class (D)	49.22	1	49.22	.89 ns
AxB	49.35	2	23.18	.42 ns
AxC	716.95	2	358.47	6.48**
AxD	55.29	2	27.54	.50 ns
BxC	52.58	1	52.58	.95 ns
BxD	302.59	1	302.59	5.47*
CxD	.49	1	.49	.01 ns
Error	5811.75	105	55.35	
Total	8249.08	119	69.32	

*F .05 (1,100) = 3.94
 *F .05 (2,100) = 3.09
 **F .01 (1,100) = 6.90
 **F .01 (2,100) = 4.82

Table 19. Scheffe's Miltiple Comparison Test: F-ratios for total number of relevant verbalizations

Age	Age	
	4	6
2	8.07**	
4	1.85 ns	

**F' (.01) = 6.90

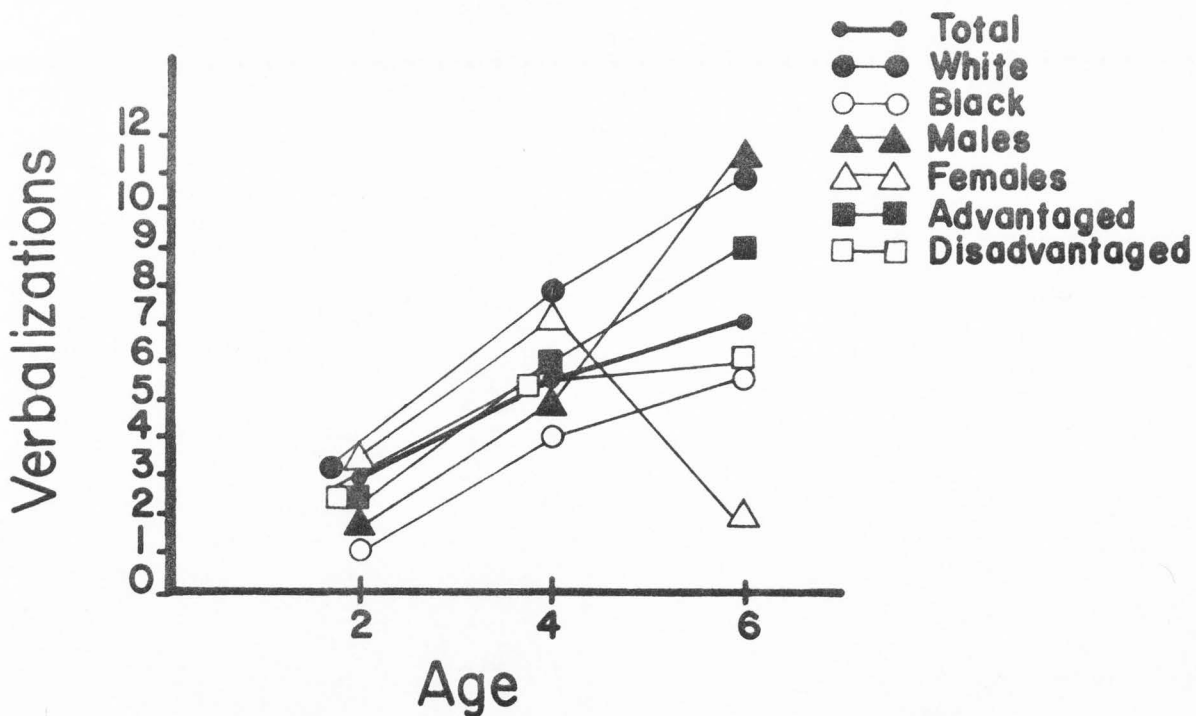


Figure 6. Mean number of task relevant verbalizations at ages 2, 4, and 6 for four groups (total group, race, sex and social class)

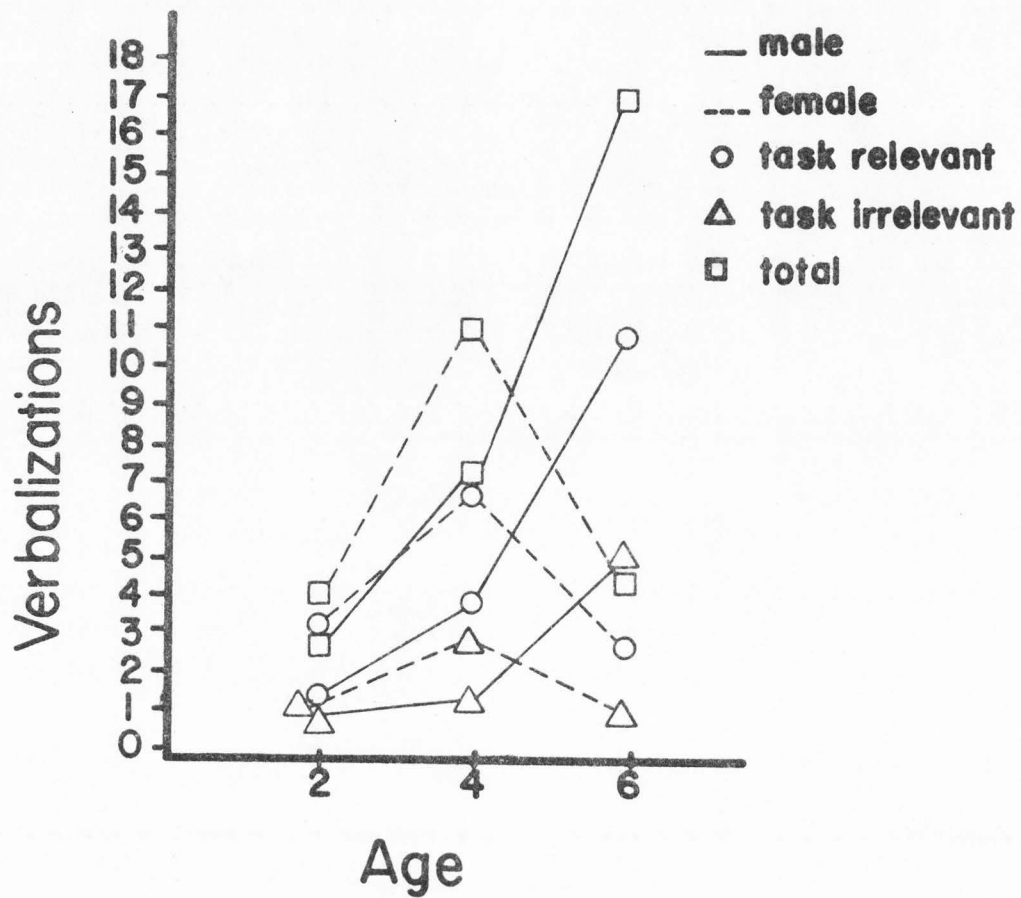


Figure 7. Developmental verbalization patterns of males and females at ages 2, 4, and 6

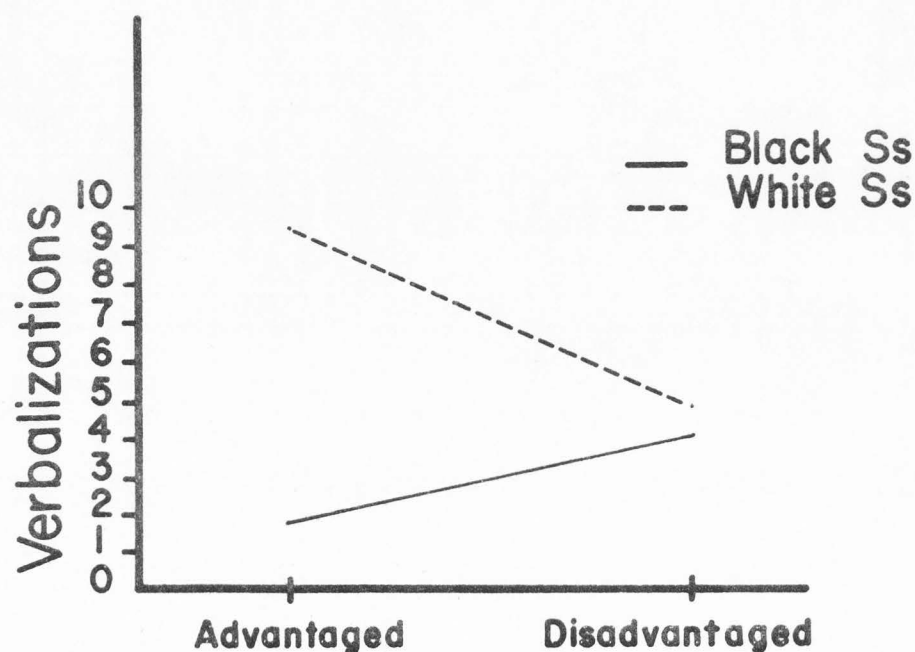


Figure 8. Mean number of task relevant verbalizations for advantaged and disadvantaged, Black and White subjects

Task irrelevant verbalizations

A significant age difference was found for the number of task irrelevant verbalizations ($F = 5.00$; $p < .01$) (Table 20; Figure 9). A Scheffe's Multiple Comparison Test was computed to determine between which age levels the significance could be attributed. The number of task irrelevant verbalizations was significantly greater at age four than age two ($F' = 10.11$; $p < .01$) and at age six than age four ($F' = 25.40$; $p < .01$) (Table 21).

White Ss used significantly more task irrelevant verbalizations than Black Ss (Table 20; Figure 9).

No significant differences in the total number of task irrelevant verbalizations were found in relations to the sex variable.

However, a significant interaction pattern between age and sex was obtained ($F = 7.09$; $p < .01$) (Table 20; Figures 7 and 9). Inspection of the Figures indicates that females used more task irrelevant verbalizations at ages two and four than males. However, at age six, males used more irrelevant utterances. Also, the irrelevant verbalizations of the males increased in a positive linear fashion from age two to six. In contrast, females increased their verbalizations from age two to age four, but at age six, the frequency of verbalizations decreased.

No significant differences in the number of task irrelevant verbalizations were found in relation to the social class variable. However, a significant age and social class interaction was obtained ($F = 3.17$; $p < .05$) (Table 20; Figures 9 and 10). Inspection of the Figures indicated that at age two, disadvantaged children used more task irrelevant verbalizations than advantaged children. At age four, the trend was reversed and advantaged children used more task irrelevant statements. At age six, the trend reverted back to the original situation in which the disadvantaged Ss used more task irrelevant verbalizations.

Total number of verbalizations

A significant age difference was found for the total number of verbalizations ($F = 5.29$; $p < .01$) (Table 22; Figure 11). A Scheffe's Multiple Comparison Test was computed to determine between which age levels the significance could be attributed. The total number of verbalizations was significantly greater at ages four ($F' = 5.09$; $p < .05$) and six than at age two (Table 23). However, no significant differences were noted between ages four and six.

Table 20. Analysis of variance: Number of task irrelevant verbalizations

Source	SS	df	ms	F
Age (A)	106.93	2	53.46	5.00**
Race (B)	57.60	1	57.60	5.47*
Sex (C)	15.24	1	15.24	1.45 ns
Social Class (D)	16.73	1	16.73	1.59 ns
AxB	32.17	2	17.08	1.53 ns
AxC	149.21	2	74.61	7.09**
AxD	66.83	2	33.42	3.17*
BxC	.75	1	.75	.07 ns
BxD	2.19	1	2.19	.21 ns
CxD	21.62	1	21.62	2.05 ns
Error	1105.65	105	10.53	
Total	1549.38	119	13.02	

*F .05 (1,100) = 3.94

*F .05 (2,100) = 3.09

**F .01 (1,100) = 6.90

**F .01 (2,100) = 4.82

Table 21. Scheffe's Multiple Comparison Test: F-ratios for total number of irrelevant verbalizations

Age	Age	
	4	6
2	10.11**	
4		25.40**

**F' (.01) = 6.90

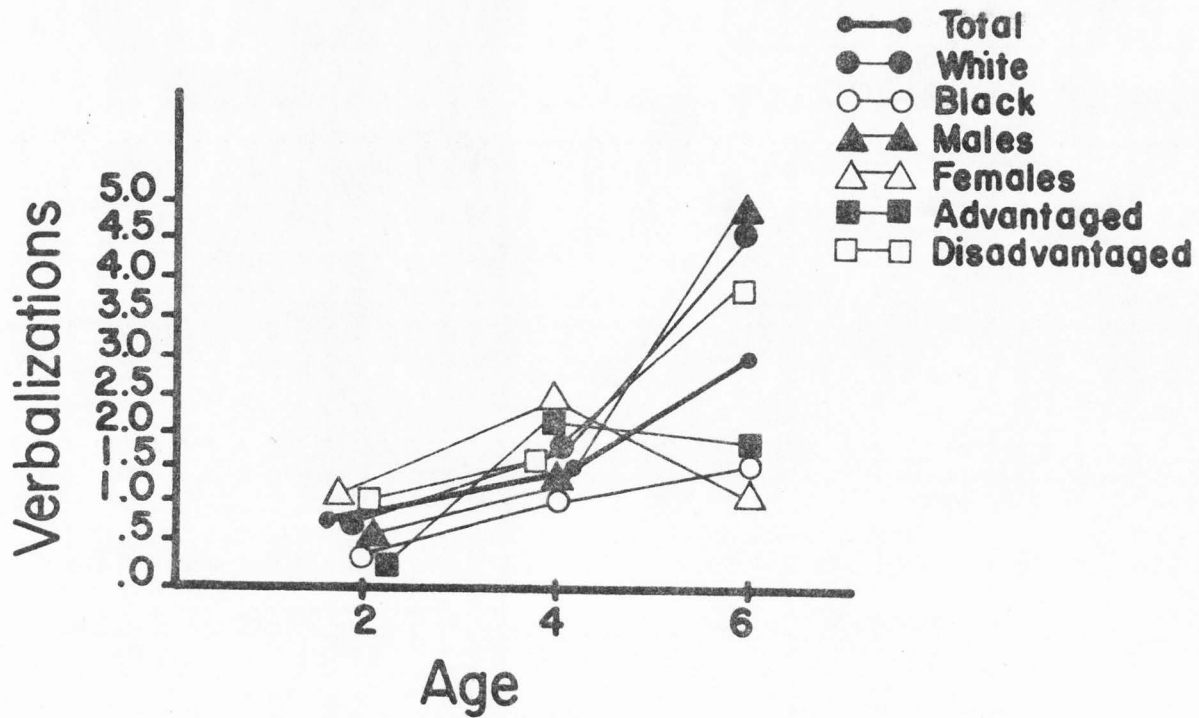


Figure 9. Mean number of task irrelevant verbalizations at ages 2, 4, and 6 for four groups (total group, race, sex, and social class)

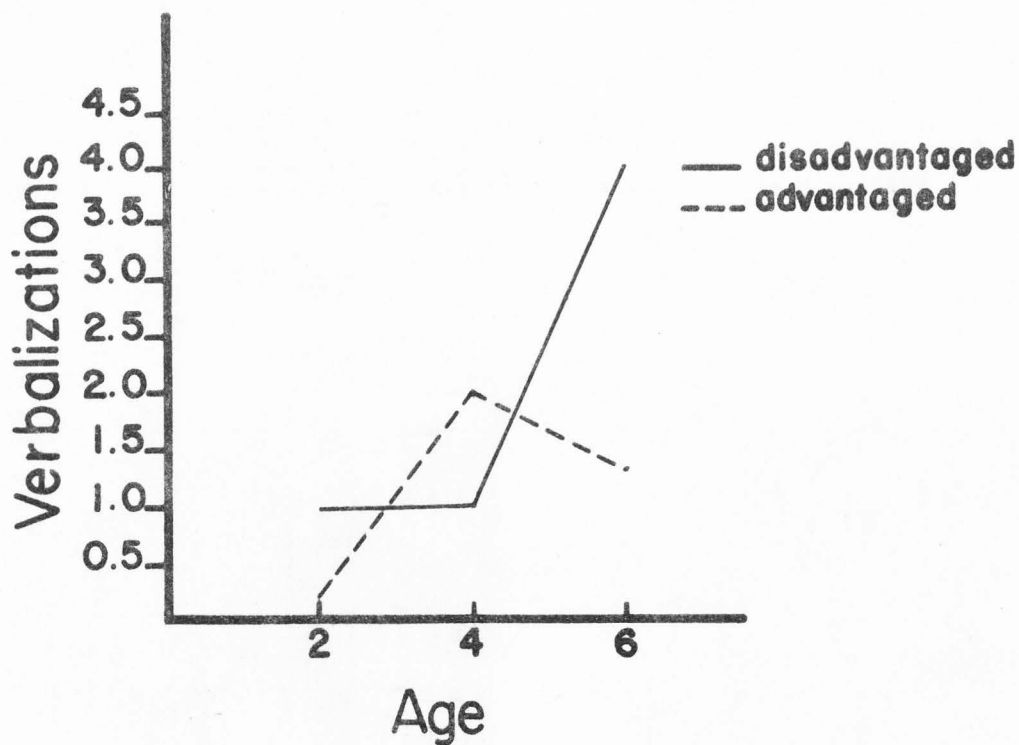


Figure 10. Mean number of task irrelevant verbalizations for advantaged and disadvantaged children at ages 2, 4, and 6

White Ss used significantly more verbalizations than Black Ss ($F = 11.52$; $p < .01$) (Table 22; Figure 11).

No significant differences in total verbalizations were found in relation to the sex variable (Table 22; Figure 11). However, a significant age and sex interaction was obtained ($F = 9.08$; $p < .01$). Inspection of Figure 11 indicated that females are more verbal at ages two and four than males. However, at age six, males were more verbal. Also, the verbalizations of males increased in a positive linear fashion from age two to age six. In contrast, females increased their verbalizations from age two to age four, but at age six the frequency of verbalizations decreased.

Table 22. Analysis of variance: Total number of verbalizations

Source	SS	df	ms	F
Age (A)	1049.50	2	524.75	5.29**
Race (B)	1143.43	1	1143.43	11.52**
Sex (C)	154.70	1	154.70	1.56 ns
Social Class (D)	30.58	1	30.58	.31 ns
AxB	177.73	2	88.87	.90 ns
AxC	1802.51	2	901.26	9.08**
AxD	3.25	2	1.63	.16 ns
BxC	57.58	1	57.58	.58 ns
BxD	277.07	1	277.07	2.79 ns
CxD	14.01	1	14.01	.14 ns
Error	10,424.40	105	99.28	
Total	15,290.31	119	128.49	

**F .01 (1,100) = 6.90

**F .01 (2,100) = 4.82

Table 23. Scheffe's Multiple Comparison Test: F-ratios for total number of verbalizations

Age	Age	
	4	6
2	5.90*	
4	.46 ns	

*F' (.05) = 3.94

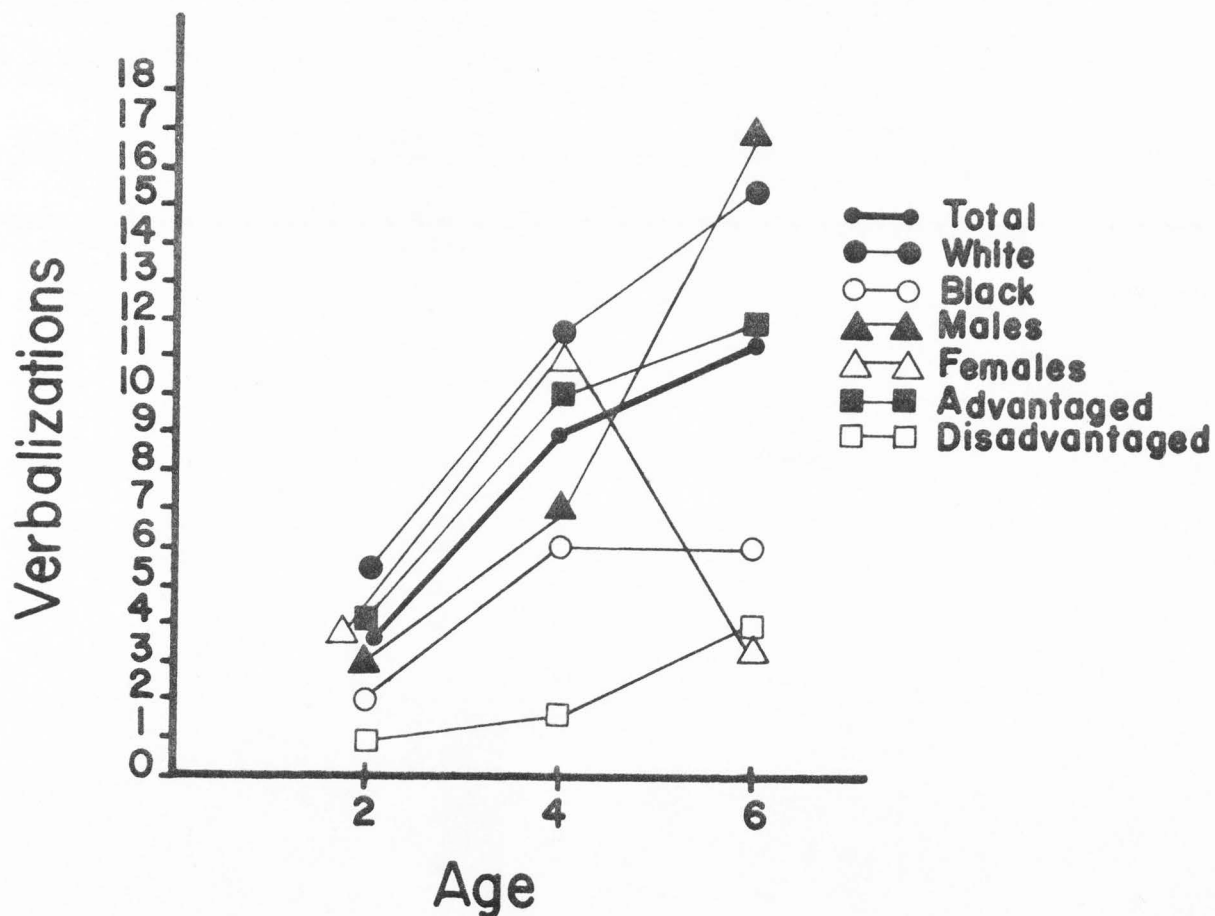


Figure 11. Mean total of verbalizations at ages 2, 4, and 6 for four groups (total, race, sex, and social class)

Summary

The total number of verbalizations and task relevant verbalizations were significantly greater for ages four and six than age two. No significant differences were noted on these variables between ages four and six. Task irrelevant verbalizations increased in a positive linear fashion across ages two, four and six.

White Ss used significantly more verbalizations, task relevant verbalizations, and task irrelevant verbalizations than Black Ss.

No significant sex differences were found for total number of verbalizations, task relevant verbalizations, or task irrelevant verbalizations. However, significant interactions were obtained between age and sex for all three verbalization variables.

No significant social class differences were obtained for the three verbalization variables. However, significant interactions between race and social class and between age and social class were obtained.

Completion of Tasks--Proportion Tables

Significance of proportions were assessed with Chi Square. The dependent variable was completion of task (yes or no). In order to reject the null hypothesis, the .05 level of significance was required.

The relationship of the number of completed tasks to White, advantaged females was significant ($X^2 = .04$; $df = 2$; $p < .03$) (Table 24). Apparently, the girls completed significantly more tasks at ages two, four, and six than they failed to complete. No significant differences in the number of tasks completed between age levels were noted.

Table 24. Chi square: Number of completed tasks by advantaged, White females

	Count Row% Col% Tot%	Age			Row Total
		2	4	6	
Yes		4	4	3	11
		36.4	36.4	27.3	78.6
		80.0	80.0	75.0	
		28.6	28.6	21.4	
No		1	1	1	3
		33.3	33.3	33.3	21.4
		20.0	20.0	25.0	
		7.1	7.1	7.1	
Column		5	5	4	14
Total		35.7	35.7	28.6	100.0

$\chi^2 = .04$; $df = 2$; $p < .03$; Contingency Coefficient = .05

The relationship of the number of completed tasks to White, disadvantaged females was also significant ($\chi^2 = 7.63$; $df = 2$; $p < .03$) (Table 25). Two sources of significance are suggested by Table 25. The probability of completing a task was (1) chance at age two, (2) significantly less than chance at age four, and (3) greater than chance (83 percent) at age six. This also suggests that the interaction may be significant.

Table 25. Chi square: Number of completed tasks by disadvantaged, White females

	Count Row% Col% Tot%	Age			Row Total
		2	4	6	
Yes		3	0	5	8
		37.5	0.0	62.5	47.1
		50.0	0.0	83.3	
		17.6	0.0	29.4	
No		3	5	1	9
		33.3	55.6	11.1	52.9
		50.0	100.0	16.7	
		17.6	29.4	5.9	
Column		6	5	6	17
Total		35.3	29.4	35.3	100.0

$$\chi^2 = 7.63; df = 2; p < .03; \text{Contingency Coefficient} = .56$$

The number of completed tasks were also significantly related to Black, disadvantaged females ($\chi^2 = 12.05; df = 2; p < .003$) (Table 26). None of the group completed a task at age two. About equal numbers of Ss completed the task at age four. All of the girls completed the task at age six. Completion of task had a positive linear function from age two to six.

Table 26. Chi square: Number of completed tasks by disadvantaged, Black females

	Count	Age			Row Total
		2	4	6	
Yes	0	2	5	7	
	0.0	28.6	71.4	41.2	
	0.0	40.0	100.0		
	0.0	11.8	29.4		
No	7	3	0	10	
	70.0	30.0	0.0	58.8	
	100.0	60.0	0.0		
	41.2	17.6	0.0		
Column	7	5	5	17	
Total	41.2	29.4	29.4	100.0	

$\chi^2 = 12.05$; $df = 2$; $p < .003$; Contingency Coefficient = .64

All of the other independent variables for which proportion tables were computed produced insignificant results (Tables 27 - 31).

Table 27. Chi square: Number of completed tasks by advantaged, Black females

	Count Row% Col% Tot%	Age			Row Total
		2	4	6	
Yes		3	1	4	8
		37.5	12.5	50.0	57.1
		60.0	25.0	80.0	
		21.4	7.1	28.6	
No		2	3	1	6
		33.3	50.0	16.7	42.9
		40.0	75.0	20.0	
		14.3	21.4	7.1	
Column		5	4	5	14
Total		35.7	28.6	35.7	100.0

$\chi^2 = 2.77$; $df = 2$; $p < .26$; Contingency Coefficient = .41

Completion of tasks was not a significant discriminator of other groups (Tables 27 - 31).

Table 28. Chi square: Number of completed tasks by advantaged, White males.

	Count Row% Col% Tot%	Age			Row Total
		2	4	6	
Yes		4	4	6	14
		28.6	28.6	42.9	87.5
		80.0	80.0	100.0	
		25.0	25.0	37.5	
No		1	1	0	2
		50.0	50.0	0.0	12.5
		20.0	20.0	0.0	
		6.3	6.3	0.0	
Column		5	5	6	16
Total		31.3	31.3	37.5	100.0

$X^2 = 1.37$; $df = 2$; $p < .50$; Contingency Coefficient = .28

Table 29. Chi square: Number of completed tasks by disadvantaged, White males

	Count Row% Col% Tot%	Age			Row Total
		2	4	6	
Yes	2	3	3	8	
	25.0	37.5	37.5	61.5	
	50.0	60.0	75.0		
	15.4	23.1	23.1		
No	2	2	1	5	
	40.0	40.0	20.0	38.5	
	50.0	40.0	25.0		
	15.4	15.4	7.7		
Column	4	5	4	13	
Total	30.8	38.5	30.8	100.0	

$X^2 = .54$; $df = 2$; $p < .24$; Contingency Coefficient = .20

Table 30. Chi square: Number of completed tasks by disadvantaged, Black males

	Count Row% Col% Tot%	Age			Row Total
		2	4	6	
Yes		2	4	5	11
		18.2	36.4	45.5	84.6
		66.7	80.0	100.0	
		15.4	30.8	38.5	
No		1	1	0	2
		50.0	50.0	0.0	15.4
		33.3	20.0	0.0	
		7.7	7.7	0.0	
Column		3	5	5	13
Total		23.1	38.5	38.5	100.0

$\chi^2 = 1.73$; $df = 2$; $p < .43$; Contingency Coefficient = .34

Table 31. Chi square: Number of completed tasks by advantaged, Black males

	Count	Age			Row Total
		2	4	6	
Yes		3	5	4	12
	Row%	25.0	41.7	33.3	75.0
	Col%	60.0	83.3	80.0	
	Tot%	18.8	31.3	25.0	
No		2	1	1	4
	Row%	50.0	25.0	25.0	25.0
	Col%	40.0	16.7	20.0	
	Tot%	12.5	6.3	6.3	
Column		5	6	5	16
Total		31.3	37.5	31.3	100.0

$\chi^2 = 89$; $df = 2$; $p < .36$; Contingency Coefficient = .23

Summary

Advantaged, White females completed significantly more tasks than they failed to complete at all ages.

Disadvantaged, White females were likely to complete a task (1) at chance level at age two, (2) significantly less than chance at age four, and (3) significantly greater than chance (83 percent) at age six.

The probability that disadvantaged, Black females would complete a task was (1) significantly less than chance at age two, (2) chance at age four, and (3) significantly greater than chance at age six.

All other groups were significantly more likely to complete a task at age six than at ages two or four. Completion of a task did not differentiate ages two or four for those groups.

Correlation matrix

Correlations were computed using Pearson's Product Moment Correlation on all dependent variables investigated in this study (Table 32). In order to reject the null hypothesis, the .05 level of significance was required. The only results discussed will be correlations that seem to have specific relevance for this study. The complete correlation matrix will be presented following the narrative presentation of results.

Total time spent on task was negatively correlated with completion of task ($r = -.33$; $p < .01$). The total number of verbalizations was the only verbalization variable significantly related to the total time spent on task ($r = .19$; $p < .05$).

Completion of task was significantly related to total time away from the task ($r = .60$; $p < .01$) and times away from the task ($r = .37$; $p < .01$). No significant relationship was found between the three verbalization variables and completion of task.

The total number of verbalizations was positively correlated with task relevant verbalizations ($r = .93$; $p < .01$) and task irrelevant verbalizations ($r = .59$; $p < .01$). Task relevant and irrelevant verbalizations are also significantly related ($r = .31$; $p < .01$).

Table 32. Correlation matrix: Total group on all variables

TT	CT	TAT	TSAT	TR	TIR	Total
TT	-.33**	-.34**	-.29**	.14 ns	.13 ns	.19*
CT		.60**	.37**	-.07 ns	-.01 ns	-.05 ns
TAT			.71**	-.12 ns	.01 ns	-.07 ns
TSAT				-.05 ns	-.01 ns	.00 ns
TR					.31**	.93**
TIR						.59**

Note: r of .19 yields t value of 2.06 *t .05 (118) = 1.98
 r of .24 yields t value of 2.69 **t .01 (118) = 2.63

Explanatory Note:

TT = total time on task

CT = completion of task

TAT = total time away from task

TSAT = number of times away from task

TR = task irrelevant verbalizations

Total = total number of verbalizations

DISCUSSION

Limitations of study

A brief discussion of the limitations of the study should precede discussion of the results. A generalization problem might arise because all of the Ss were from central Arkansas and formally enrolled in ECE programs. This study's selection criterion detracts from the power of generalization statements about children in other geographical areas or not enrolled in an ECE program.

Another problem was the time of year during which data was collected. Most of the pre-school children were in twelve month programs or returning to programs they previously attended. However, all of the six year olds were in their first month of of the first grade. The excitement of the first month of school and the extreme desire to please are traits universally attributed to new first graders. These behavioral characteristics may have affected the performance of six year old Ss in this study.

A third contaminating factor may have been the "ecological" nature of the study. Because the child was performing in the classroom, it was obvious to the subject and his peers that he was receiving special attention (i.e., "Hawthorne Effect"). However, it was believed that the benefits of a "naturalistic" setting offset this deficiency.

A related problem is that the subject was working for an adult in a one-to-one situation. This is not the typical academic situation. A systematic replication of the study in which individuals worked as part of a group to an adult might yield interesting and different data.

Another confounding variable may have been the children's perception of the sexual appropriateness of the task. Traditionally, folding clothes was considered a female task. The possible effect on the study of this traditional viewpoint was an "a priori" consideration. The preexperimental conclusion was that folding clothes was appropriate for the sample. After interviewing mothers and observing the behavior of pilot and experimental groups, the writer believed that his "a priori" conclusion had been verified. Of course, systematic investigation of folding clothes may disprove the conclusion and observations. In fact, a sexual role identification - task interaction appeared to be a significant factor in at least one instance. A six year old, advantaged Black, male subject folded and classified all of the task items, except female clothing. He stated that the task was completed, while all of the female articles of clothing still remained "untouched" in the clothes basket. In summary, the effects of sexual role identification and perception of the sexual appropriateness of the task were not clearly demonstrated or controlled in this study.

Another possible limitation, which this study did not investigate, was the differential effects of instructions. Different populations may interpret verbal instructions differently (i.e., advantaged vs disadvantaged groups). For example, the instructions may have been interpreted as orders by one group and as requests by another group. Therefore, differential TP behavior might be a function of the Ss' interpretations of instructions, rather than different TP capacities. The experimenter's opinion is that a complex interaction between TP and interpretation of instructions probably exists. Since interpretation of instructions is probably related to TP and academic

performance, identification of group differences in this area may be valuable curricula considerations for future ECE research.

Summary of results

A brief summary of results will be presented to enhance the relevancy of the discussion for the reader.

Time on and away from task significantly differentiated ages two, four, and six. Time on task produced a positive linear function across ages. Time away from task produced a negative linear function.

Black students spent significantly more time on and away from task than White students.

Time on and away from task did not differentiate male and female groups.

Advantaged children spent significantly more time on task and significantly less time away from task than disadvantaged children.

Completion of task failed to differentiate two and four year old children. However, six year olds completed significantly more tasks than two or four year olds.

Ethnic differences were not significantly differentiated by the completion of task variable.

Males completed significantly more tasks than females.

Advantaged children completed significantly more tasks than disadvantaged children. However, presentation of subgroup characteristics may also be of value. For example:

- 1) advantaged, White females completed significantly more tasks than they failed to complete at all ages,

- 2) disadvantaged, White females were likely to complete a task (1) at chance level at age two, (2) significantly less than chance at

age four, and (3) significantly greater than chance (83 percent) at age six, and

3) the probability that disadvantaged, Black females would complete a task was (1) significantly less than chance at age two, (2) chance at age four, and (3) significantly greater than chance at age six. All other groups were significantly more likely to complete a task at age six than at ages two or four. Completion of a task did not differentiate ages two or four for those groups.

Total time spent on task was negatively related to the completion of task ($r = -.33$; $p < .01$). Completion of task was significantly related to total time away from the task ($r = .60$; $p < .01$) and times away from the task ($r = .37$; $p < .01$).

No significant relationships between verbalization variables and task completion were obtained.

The number of times away from the task failed to differentiate any of the independent variable groups.

Number of verbalizations significantly differentiated two year olds from four and six year olds. These variables failed to differentiate four and six year olds. The number of task irrelevant verbalizations increased in a positive linear fashion across ages two, four, and six.

White Ss used significantly more verbalizations, task relevant verbalizations, and task irrelevant verbalizations than Black Ss.

No significant sex differences were found for total number of verbalizations, task relevant verbalizations, or task irrelevant verbalizations. However, significant interactions were obtained between age and sex for all three verbalization variables.

No significant social class differences were obtained for the three verbalization variables. However, significant interactions between race and social class and between age and social class were obtained.

Although total time on task was mildly correlated with the total number of verbalizations ($r = .19$; $p < .05$), no educationally significant correlations were obtained between the verbalization variables and other dependent variables. In the "work" task situation, task relevant verbalizations were highly correlated with the total number of verbalizations ($r = .93$; $p < .01$). Task irrelevant verbalizations were also significantly related to the total number of verbalizations ($r = .59$; $p < .01$).

Interrelationship of variables

An unexpected finding of the study was the relationship of the completed task to the other dependent variables. More specifically, the negative correlation between total time spent on a task (i.e., TP) and completion of a task. If the longer a child spends on a task tends to reduce the probability that he will complete it, then the value of TP in academic training may be questionable. The problem becomes more complicated when the positive correlation of a completed task with total time away from the task and number of times away from the task are considered.

The data seem to suggest that extended involvement in a task is detrimental to the final outcome. However, the reported relationships are probably misleading. One reason is that the criterion for completion of task was not qualitative. For some Ss, completion of a task, regardless of the quality of the outcome, may be perceived as a

necessary step to escape the "work" situation. This explanation was subjectively verified by the E's observation that many advantaged children would work conscientiously at the task until they tired of it. Then, suddenly, they would empty the remaining clothes in a pile. In contrast, the disadvantaged children would verbally refuse to do any more work or simply walk away from the task. Apparently, for these children, completing the task was not perceived as a step necessary for escape from the task.

Another possible explanation is that children in these age groups may not have associated the concepts of conscientious work and completion of the task. For example, many children folded and placed clothes very meticulously, but quit when they became tired or bored. Others never appeared to be concerned with quality, but concentrated their efforts on completion of the task. Although a few six year olds combined these two work traits, the combination was extremely rare among two and four year olds.

A third explanation for the correlation results may be that changing activities during an experimental session inhibited boredom and fatigue with the experimental task. On the other hand, spending considerable time on the task may satiate "work" attitudes and evoke novelty seeking behavior. Also, the task may develop more aversive qualities as time spent on the task increases. Therefore, when the child escapes the situation after prolonged exposure, he is more likely to avoid the task in the future.

Of course, it may be that the longer one spends on a task, the less likely he is to complete it, which may be explained by different work styles. However, this interpretation contradicts the consensus

of past research (i.e., Lahaderne, 1968; Ryans, 1938a) which found that TP is positively related to achievement. Therefore, the writer is inclined to assume that one of the first three explanations have a greater likelihood of being correct. If that assumption is true, a function of ECE would be to develop an appreciation for quality of work tempered with an awareness of the need to complete a task. If TP can be trained (i.e., Hall, et al., 1968; Martin and Powers, 1969), TP behavior which leads to completion of the task in a qualitatively acceptable manner should also be trainable.

These research findings do not invalidate the importance of TP, but reemphasize the point that TP is not the only variable associated with quality outcomes. The results suggest that the relationship of TP and distractions may be constructive under optimal conditions. However, because this is an incidental finding of the study, further research is needed to allow confident conclusions.

Time on and off task

Another significant finding was that TP significantly increased across ages two, four, and six. These results from a "natural work" situation corroborate previous research in "natural play" situations (i.e., Bott, 1928; VanAlstyne, 1932). The complement of this finding is that the total time away from task significantly decreased across ages two, four, and six. These developmental findings suggest that TP behavior and task irrelevant behavior can be learned as early as age two. Therefore, TP may be a reasonable curriculum consideration as early as age two.

Assuming that the developmental patterns of time on and away from task are valid, developmental patterns which differentiate special

groups may suggest which groups require more intense TP training. ECE programs, which enrolled a large porportion of children with special needs, would probably need to consider programming TP experiences into their curricula.

Disadvantaged groups spend significantly less time on task and significantly more time away from task than advantaged children. Therefore, programs for the disadvantaged should probably plan a systematic, general TP curriculum.

On the other hand, Black children spent significantly more time on and off tasks than White children. This pattern of results implies a need for special training in special areas. Programs for predominately Black populations would stress training which inhibited task irrelevant behavior. Programs for predominately White populations would stress training which increased task relevant behavior.

These group differences can be translated into special curriculum considerations. For example, if an ECE program was primarily composed of disadvantaged Black children, the TP curriculum would teach general TP behavior with special emphasis on eliminating task irrelevant behavior. On the other hand, if a program was primarily designed for disadvantaged White children, general TP behavior would be taught with emphasis on increasing the time spent on task.

However, as noted earlier, training which keeps a child on a task longer is not sufficient, by itself, to improve academic achievement (Siegelman, 1969). An adequate training program must also incorporate (1) teaching problem solving processes, (2) an appreciation for an acceptable quality of performance, and (3) a desire to complete the task.

An important consideration, which was not investigated in this study, was the nature of off-task behavior and its functional relationship to performance on the task. It may be critical to determine the characteristics of off-task behavior that enhanced the child's chances of completing a task.

Completion of tasks

Completion of tasks was not significant within or between age groups two and four. However, the six year old group completed significantly more tasks than it failed to complete and than either two or four year olds. These results imply that completion of task is not a predictable behavior in children until after age four.

However, exceptions to this general finding were identified. White advantaged females finished significantly more tasks than they failed to complete at all three age levels. The developmental pattern was also different for White and Black, disadvantaged females. Completion of a task for the disadvantaged White female was (1) a chance occurrence at age two, (2) significantly unlikely to occur at age four, and (3) significantly likely to occur at age six. The probability that a disadvantaged Black female will complete a task is (1) significantly unlikely at age two, (2) chance at age four, and (3) significantly likely at age six.

These results suggest that all groups, other than advantaged White females, need experiences which develop task completion behavior at ages two and four. However, completion of task was almost universal at age six. Therefore, concern about this behavior as an entry skill for public school may be unwarranted. Rather than make completion of task a component of an ECE curriculum for all children,

the educator could identify those children who failed to reach this criterion and provide special, individualized instruction for them.

Verbalizations and developmental trends

Although verbalizations were incidental considerations of this study, some of the findings are noteworthy. As expected, the number of task irrelevant verbalizations significantly increased across ages two, four, and six. However, the findings that task relevant and total number of verbalizations were not significantly different at ages four and six were not expected.

One possible explanation for these findings is that task relevant verbalizations are used for self control and task irrelevant verbalizations are used to control or engage the behavior of others. As the child improves his language abilities, language needed for self control and organizing experiences probably becomes more covert (Luria, 1957). However, language needed to control the environment must remain overt (i.e., discussing what to do at recess). This implies that for the verbally sophisticated, task oriented subject, language may be an effective covert tool. However, the same subject would demonstrate increased task irrelevant verbalizations because his skills must be externalized to effectively engage the environment.

Another possible explanation of the verbalization results is that subgroup differences cancelled each other out at ages four and six, so that overall group differences were not obtained in the total sample. For example, White Ss used significantly more verbalizations than Black Ss on all three verbalization variables (i.e., Figure 6, page

51; Figure 9, p. 56; Figure 11, p. 58), or male-female differences at age six (Figure 7, p. 52).

A third possible explanation is that there are, in fact, no differences in the total number and task relevant verbalizations of children four and six years of age. However, this interpretation of the data does not agree with previous research or theoretical findings on total verbalizations. Previous research has reported a systematic increase in total utterances through the preschool years into adulthood (Mussen, et al., 1969, pp. 295-302). Therefore, the writer believes that the explanations of increased language sophistication and the offsetting effect of intragroup differences are more valid explanations of the developmental trends obtained on the three verbalization variables. The results may be a function of the interaction of these two explanations.

Verbalizations and ethnic differences

Another verbalization result of interest was the finding that White Ss used significantly more verbalizations, task relevant verbalizations, and task irrelevant verbalizations than Black Ss. These differences assumed a "cululative deficit" function (Bloom, 1964). This finding agreed with all previous research. However, its nonsignificant relationship to the total time spent on task, which was greater for Black children, as noted above, requires further exploration. In fact, the time spent on task is not significantly related to the number of task relevant verbalizations and only moderately related to the total number of verbalizations. The picture becomes more complex when the finding that completion of task failed to significantly differentiate Black and White groups at ages two, four and six is considered.

Relating these ethnic differences is difficult with the present data because the present study was not designed to investigate this problem. However, it appears that Black and White children are using different modes of work and producing similar results. White children use more overt verbalizations and spend less time on task while Black children spend more time on task and use less verbalizations. This may imply that language facilitates performance rate. Although completion of task does not differentiate the groups, a qualitative completion of task criterion might differentiate the groups. However, this study cannot answer that question.

Verbalizations and sex differences

A third aspect of the verbalization results is the observation that boys and girls verbalize differently on "work" tasks at ages two, four, and six. Girls verbalize (total, task relevant, and task irrelevant verbalizations) more at ages two and four. However, at age six, the number of girls' verbalizations are less than their age four level and less than the number of verbalizations by the boys. It would appear that this finding tends to support the theory that girl's language skills mature more rapidly than boys. By age six, many girls are internalizing their verbal mediators while boys are still externalizing their cues. If this is true, it would mean that much of the first grade male's "talking-out" is necessary for optimal use of his verbal mediators. Girls, on the other hand, may use covert mediators well and, therefore, perform equally well on tasks, while developing a positive "halo effect" with the teacher for "working quietly."

Another possible explanation of the sexual differences may be that girls may have been the "problems" in preschool because they talked more. As a result, they were "taught" to be quiet by various means. Because they did talk less, the boys did not receive the same extent of "task appropriate" verbalization training. In fact, the boys may have perceived their unreinforced verbal behavior as being tacitly approved. The boys may also have perceived verbalization as an attention attaining behavior in the girls. In any event, overt verbalizations in work situations were apparently learned to be appropriate by boys and inappropriate by girls.

Verbalizations and social class

The relationship of verbalizations on a "work" task to social class was the fourth verbalization consideration. No significant differences in the total number of verbalizations, total relevant verbalizations, and task irrelevant verbalizations between advantaged and disadvantaged groups were found. However, White children used more verbalizations than Black children. Also, advantaged White children used more task relevant verbalizations than disadvantaged White children. The reverse was true for Black children (see Figure 6, p. 51)¹

Task irrelevant verbalizations are used more at age two and six by disadvantaged children and at age four by advantaged children (Figure 9, p. 56). Language experiences of the two groups on "work" tasks apparently develop comparable quantities of verbalizations.

¹The explanation for this finding is unclear unless it is attributable to points of emphasis in the ECE program in which the groups were enrolled.

However, the experiences of the advantaged group refine the quality of verbalizations so they are more task relevant.

Verbalization implications for ECE

A major implication of this study is that teaching the use of task oriented verbalizations is not likely to increase the amount of time spent on task. The results indicated that the time spent on task was not significantly related to the number of task relevant verbalizations and only moderately related to the total number of verbalizations (Table 32, p. 69). However, training experience with task oriented verbalizations should be beneficial. In fact, it may reduce the time needed to spend on the task and improve the quality of the product.

Planning verbalization experiences on "work" tasks in ECE might be facilitated by considering data from the present study. First, proper use of verbal mediators seems to be very important. Initially, this skill might require the child to overtly use the mediators, then covertly integrate mediators into the "work" process.

A second consideration for the ECE professional is different verbalization skills of different groups. For example, Black children apparently need more opportunities to verbally refine and express their experiences than White children. Boys may need more quantitative and qualitative verbalization training on task appropriate behavior than girls. Disadvantaged children need more specific training for use of task relevant verbalizations than advantaged children. However, disadvantaged Black children tend to use more task relevant verbalizations than Black advantaged children.

Therefore, when planning verbalization experiences on "work" tasks, the early childhood educator should consider (1) initial use

of oral verbalizations, to be eventually transformed to covert verbalizations of task oriented behavior and (2) greater training emphasis on task oriented verbalizations for Black than White populations, for boys than girls, for disadvantaged than advantaged groups. One questionable exception to this generalization is that disadvantaged Black children used more task relevant verbalizations than advantaged Black children.

SUMMARY AND CONCLUSIONS

Introduction

Although inconclusive, this study has expanded the data base on task oriented behavior in ECE. The information should provide additional curriculum considerations for early childhood programs, especially those with homogeneous groups of Black-White, male-female, or socially advantaged-disadvantaged children.

Task persistence

The review of the literature identified task persistent and oriented behavior as an entry skill requisite for adequate performance in public schools. This study found that TP develops in a significant, positive, linear fashion across ages two, four and six. This finding suggests that TP training may be initiated as early as age two. The need now exists to verify the implication of this finding.

Programs designed primarily for disadvantaged Black children apparently need to stress training which increases time spent on task and decreases time spent away from task more than programs designed for other populations. Blacks, in general, spent more time on and away from the task than Whites.

Completion of task

Although completion of task did not function as the study originally hypothesized, the findings on this variable may have educational significance. Completion of task differentiated six year olds from two and four year olds, but failed to differentiate two and four year

olds. Tasks were completed significantly more often at ages two and four by males than females and by advantaged than disadvantaged children. However, the differences faded out by age six. Therefore, the need for completion of task training as a general requirement in ECE is questionable. This should probably be more of an individual consideration.

The exceptions to the findings above were advantaged, White girls, who completed significantly more tasks at all ages than they failed to complete. This finding implies that completing a task can be learned as early as age two.

Verbalization

The incidental findings on the verbalization variables also appear to have significant implications for ECE. Although the number of verbalizations increased at each age, the differences between ages four and six were not significant. This may have reflected a shift to covert mediation on tasks on or about age four.

Task oriented verbalizations were used significantly more frequently by White children. This suggests that ECE programs for Black children should include task relevant verbalization training.

Males and females had different developmental patterns of verbalizations. Apparently males need more emphasis on verbalization training at ages two and four. The writer concluded that girls shift from overt to covert mediators at an earlier age than boys. Therefore, the girls' decrease in verbalizations at age six is understandable. At age six, the boys continued to increase their number of overt verbalizations.

Disadvantaged children used more task irrelevant verbalizations at ages two and six than advantaged children. Apparently, they need

more emphasis placed on refining their verbalizations so they are more task relevant.

Correlations

One of the most startling findings was the significant negative correlation between total time spent on the task and completion of the task. Another was the significant positive correlation between completion of a task and total time away from the task and number of times away from the task. Apparently, brief distractions of less than three minutes increase the probability of completing a task. This observation might be evaluated in an ECE setting to evaluate its validity.

The correlation between the total number of verbalizations and total time spent on task was moderate. Otherwise, the number of verbalizations (task relevant, irrelevant, and total) had no significant relationship to total time on task, completion of task, total time away from task, or number of times away from task.

Independence

A subjective observation, which bothered the experimenter, was the children's reluctance to seek help when it was appropriate (i.e., folding a double sheet). This inappropriate behavior may have been a function of the experimenter being a stranger or intense independence training. If failure to appropriately seek assistance is a function of training, the writer believes that training methods should be revised to include training for appropriate dependency behavior.

Conclusion

Any TP training program must consider the significant negative correlation between the time spent on the task and completion of the

task. Also, task oriented verbalization training cannot be expected to significantly increase the time spent on a task or the number of completed tasks. These three variables should probably be trained concurrently.

Obviously, task oriented training (whether it is task persistence, completion of tasks, or task relevant verbalizations) is necessary for adequate performance in public schools. However, it is not sufficient by itself to guarantee adequate success.

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Graduate Teaching Assistant, Utah State University, 1971-
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Psychological Examiner, Special Education, Utah State University, January - March 1972. Duties included administering, scoring, and reporting psychological evaluations of elementary age children.

Graduate Teaching Assistant, Utah State University, 1970-71, Human Development (General) (5 quarters). Duties included class programming; lectures; developing, administering, and scoring tests; supervision of undergraduate assistants. Class size ranged from 60 to 75.

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