

**RELATIONSHIPS OF THE McCARTHY  
SCALES OF CHILDREN'S ABILITIES AND  
THE WECHSLER INTELLIGENCE SCALE  
FOR CHILDREN - REVISED**

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47

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CHILDREN-REVISED

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An Abstract  
Presented to  
the Graduate Council of  
Austin Peay State University

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In Partial Fulfillment  
of the Requirements for the Degree  
Master of Arts

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by  
Pamela Ann Watts

August 1979



## ABSTRACT

The purpose of this study was to investigate relationships between the McCarthy Scales of Children's Abilities (McCarthy) and the well known Wechsler Intelligence Scale for Children-Revised (WISC-R).

The subjects were 32 children enrolled in the first grade at St. Bethlehem Elementary School in Montgomery County, Tennessee. The subjects were given the McCarthy and the WISC-R individually with an interval of approximately nine months to a year between the two testing sessions.

A significant correlation was found between the Verbal, Perceptual-Performance, and the General Cognitive Index (GCI) which partially comprise the McCarthy Scales and the Verbal, Performance, and the Full Scale IQ scores which comprise the WISC-R. Additional significant positive correlations were found between selected subtest scores.

These results support the contention that there is a relationship between the McCarthy and the WISC-R and also lend support to other studies that found a relationship between the two instruments.

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Pamela Ann Watts  
August 1979



To the Graduate Council:

I am submitting herewith a Thesis written by Pamela Ann Watts entitled "Relationships of the McCarthy Scales of Children's Abilities and the Wechsler Intelligence Scale for Children-Revised." I recommend that it be accepted in partial fulfillment for the degree of Master of Arts, with a major in Psychology.

Elizabeth H. Stokes  
Major Professor

We have read this thesis and  
recommend its acceptance:

Linda B. Rudolph  
Minor Professor  
or  
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Cyril J. Ladowski  
Third Committee Member

Accepted for the  
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Dean of the Graduate School

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## CHAPTER I

### INTRODUCTION

There have been and will continue to be individual tests developed to evaluate the intellectual capacities, or more specifically, the academic abilities of children. These instruments are first developed on the basis of construct and content validity by utilizing previous knowledge and theories of the factors that constitute academic ability. It is then necessary to determine the criterion validity of newly developed instruments. The major criteria used in determining such validity traditionally have been school grades, teachers' rating of competencies, standardized achievement tests, and other instruments purported to measure the same abilities as the newly constructed test.

A relatively new measure, the McCarthy Scales of Children's Abilities (McCarthy), was developed in 1974 for the purpose of identifying children between the ages of  $2\frac{1}{2}$  and  $8\frac{1}{2}$  years with special problems. It has been recommended for screening of kindergarten children to determine need for special help or intervention early in a child's educational career.

It would be of value and interest to compare the relationship or relationships of the McCarthy with one of the older well recognized individual assessment instruments, specifically, the Wechsler Intelligence Scale for Children - Revised (WISC-R), published in 1974. Both the McCarthy and the WISC-R are

individual intelligence tests, therefore, one would expect a significant relationship between scores on the tests since they measure similar constructs in a similar way. Also, the McCarthy assesses several areas of a child's cognitive and motor development and the WISC-R assesses verbal and performance abilities. Since the cognitive and verbal dimensions and the motor and performance dimensions appear to be conceptually similar, significant correlations between these dimensions might be expected.

### Review of the Literature

Upon the initial examination of the McCarthy Scales one would get the impression that the General Cognitive Index (GCI) is the same as an Intelligence Quotient (IQ) score in its function. The IQ score is the name given to the score obtained when using the WISC-R and numerous other intelligence tests. McCarthy (1972, p. 5) states, "The term IQ has been deliberately avoided in the McCarthy Scales because of the many misinterpretations of the concept and the unfortunate connotations that have become associated with it."

The results of a study conducted by Kaufman and Kaufman (1973) challenged this impression. Their study explored racial differences for separate groups of black and white children who were matched on many variables including social class. They reported that black children ages  $2\frac{1}{2}$  to  $5\frac{1}{2}$  years obtained a mean GCI close to 100 (GCI = 96) and did not differ significantly from whites on the GCI or on the specific



cognitive scale indexes. They also pointed out that the white children scored significantly higher than the blacks at ages  $6\frac{1}{2}$  to  $8\frac{1}{2}$  years and that the results at the younger ages were quite different from results of black-white IQ studies.

Another study suggesting a real distinction between the GCI and the IQ score involves learning disabled populations. This study was also conducted by Kaufman and Kaufman (1974). They reported the results of testing 22 children, aged 5 to 9 years, having minimal brain dysfunction. The statistics for this group reported a mean GCI of 66.2, which was 15.4 points lower than their mean IQ score of 81.6, based on previous testing with either the WISC or Stanford-Binet Intelligence Scales (RSB). In a further study also involving a learning disabled population, DeBoer, Kaufman, and McCarthy (1974) reported GCI's and IQ scores (either WISC, WPPSI, or RSB) for a group of 41 children ages  $4\frac{1}{2}$  to  $8\frac{1}{2}$  years. The conclusion reported by the authors was that despite a mean IQ score of 96.6, this group of children had a mean GCI of only 80.6, a 16-point discrepancy.

The GCI and IQ score yield similar mean scores with normal children according to data in the McCarthy manual (1974). A group of 35 white children, 18 boys, 17 girls, all first graders in a parochial Catholic school in New York City, were tested with the McCarthy, the RSB, and the Wechsler Preschool and Primary Scale of Intelligence (WPPSI). The ages

of the children ranged from 6-0 to 6-7 years with a mean age of 6-3. McCarthy (1974) reported a mean GCI of 104.0 and a mean WPPSI Full Scale IQ score of 106.3. The mean RSB IQ score based on 1960 norms was 115.5, but when rescored with the 1972 norms, the mean dropped to 109.1. She reported correlation coefficients of .63, .62, and .71 between the WPPSI Verbal, Performance, and Full Scale IQ scores, respectively, and the McCarthy GCI.

Harrison and Wiebe (1977) conducted a correlational study of scores on the McCarthy and the Wechsler Intelligence Scales for Children (WISC) and the RSB in an effort to demonstrate criterion validity for the McCarthy Scales. The sample included 111 children between the ages of  $2\frac{1}{2}$  and  $8\frac{1}{2}$  years. As reported by Harrison and Wiebe (1977), the 1960 RSB IQ score was strongly related to many of the McCarthy Scales. A significant correlation of approximately .50 was reported between the 1960 Binet IQ score and the McCarthy Verbal, Memory, and Index scales. According to Harrison and Wiebe (1977), correlations between WISC IQ scores and McCarthy scales were both larger and more highly significant than the correlations between the McCarthy and the 1960 Binet IQ scores. The authors reported that the WISC Verbal IQ score proved to be related to the McCarthy Verbal scale ( $\underline{r} = .52$ ) and the GCI ( $\underline{r} = .59$ ). They reported that the Performance IQ score produced more and stronger significant correlations with the McCarthy scales than the

WISC Verbal IQ score, with  $\bar{r}$  in the mid-fifties for McCarthy Quantitative and Memory scales. Also reported were correlations in the lower sixties between both the McCarthy Perceptual-Performance and Motor Scales and the WISC Performance IQ score. The Performance IQ score and the McCarthy GCI produced a significant  $\bar{r}$  of .73.

The McCarthy Scales were administered to 51 second graders late in 1975 and during the spring of 1976 in a study reported by Davis and Walker (1977). The age range of the sample was 7-0 to 8-7 years with a mean age of 8-1. The WISC-R was administered first to 25 children and the McCarthy scales administered first to the remaining 26, with the interval between tests ranging from 1 to 18 days with mean interval of three days. There were 27 females and 24 male children, 28 Hispanic and 23 non-Hispanic. They reported that the correlations between the McCarthy GCI and the WISC-R Verbal, Performance, and Full Scale IQ scores were respectively .65, .62, and .75. According to the authors the following means and standard deviations, respectively, were reported for this group of children: McCarthy GCI 97.6 and 10.2; WISC-R Verbal IQ score 99.5 and 15.9; Performance IQ score 99.2 and 12.9; and Full Scale IQ score 99.2 and 13.9.

In another correlational study, comparing the McCarthy and the Detroit Tests of Learning Abilities, Wiebe and Harrison (1977) used a sample of 111 children between  $2\frac{1}{2}$  and



8½ years of age. The mean chronological age (CA) of the children was 5-8. The authors reported that when comparing the Detroit scale mental age (MA) to each McCarthy scale MA, all relationships reached  $\underline{r} > .70$ . Almost 67 percent of the common variance was accounted for by the correlation ( $\underline{r} = .82$ ) of the Detroit MA and the McCarthy MA based upon the GCI. The mean Detroit MA correlated .77 with the McCarthy Verbal, Perceptual-Performance, and Motor Scales, accounting for almost 60 percent of the common variance. The authors pointed out that both the Detroit and the McCarthy tests purport to offer analysis of learning abilities of young children. When these two instruments were compared on this sample of children, whose mean age was less than six, limited similarity was demonstrated, according to the authors. They concluded that the McCarthy GCI and the mean MA score from the Detroit both assume the properties of general abilities measures.

Davis and Rowland (1974) used a population of 33 children, 17 boys and 16 girls, in their reported study. The chronological ages of the children were from 2-5 to 8-6 years, with a median age of 6-5. The authors reported that the 1960 RSB IQ scores for the 33 subjects ranged from 70 to 168 with a median of 107.5, and 1972 norms gave a range from 150 to 157 with a median of 102.5. When comparing these distributions with the GCI's, the authors reported a range of 52 to 148 with a median of 101.5.

According to the authors, the mean GCI of 100.9 was about eight points lower than the mean IQ score using the 1960 norms and one point lower using the 1972 norms. The authors did not actually quote the mean RSB IQ score, but did report the median score, which appeared to be the figures used in their comparison. The 1960 norms yielded RSB scores higher than the GCI for 78 percent of the subjects. The 1972 norms produced RSB scores that were equal to or lower than the GCIs for 51 percent of the sample.

According to Davis and Rowland (1977), these preliminary results indicate that for these children the McCarthy yields a GCI that parallels both the 1960 and 1972 RSB IQ scores. The differences, according to the authors, are not significant. The authors conclude that this comparison lends support to the impression that the McCarthy and the RSB measure much the same abilities with approximately the same moderate degree of precision.

It is the opinion of the author of this paper that correlational studies are conducted in order to determine the relationship between tests, to investigate the similarities or differences of scores earned on the instruments, and/or to attest to the superiority or inferiority of one instrument over the other for predictive purposes. The purpose of this study will be only to determine if there is a relationship between the McCarthy Scales and the WISC-R for the population

in this study. Davis and Walker (1976, p. 966) make this statement about the value of correlational studies:

Although correlational studies are of limited advantage, they remain the backbone of all evaluation of standardized tests. The fact that they are subject to many forces which are difficult to identify and control makes for confusion concerning the usefulness of the tests. Nevertheless, most of what we know about tests is expressed as correlations, and correlations probably will continue to be the most readily obtained and interpreted test data.

### Need for the Study

As to date, there have been very limited published correlational studies comparing the WISC-R with the McCarthy for the 6 to 7 age group who have completed first grade. A need for research in this area was mentioned by Kaufman and Kaufman (1977). The reported research on the equivalency of the GCI and the IQ scores also have yielded conflicting data, which suggest the need for continuing study of this problem.

### Statement of the Problem

This study is being conducted to investigate the relationships between the McCarthy and the WISC-R with the 6 to 7 year age group. The Verbal, Perceptual-Performance, and the GCI which partially comprise the McCarthy will be compared with the Verbal, Performance, and the Full Scale scores obtained from the WISC-R. In addition, the correlations between selected subtests scores will be investigated.



Kaufman and Kaufman (1977) suggested the use of follow-up testing to produce greater understanding of a child's hypothesized strengths or weaknesses found on the McCarthy. They stated that if a child exhibited a relative strength on McCarthy tests which require good verbal concept formation, such as Word Knowledge and Opposite Analogies, longer and more reliable tasks requiring the same abilities might be administered. They suggested the administration of the WISC-R Similarities and Vocabulary subtests to verify the strength found on the McCarthy.

If a child does poorly on Word Knowledge, Verbal Memory II, and Verbal Fluency, Kaufman and Kaufman (1977) suggested that a verbal expressive problem may exist. They recommended administering additional tasks requiring expressive skills, one of which was the WISC-R Comprehension subtest. They noted that if an expressive problem does exist, then the child's Verbal Index may not adequately reflect his verbal intelligence. In such a case, they recommended the administration of the WISC-R Information subtest which requires less verbalization.

They further stated that if a child evidences awkward fine motor coordination and does poorly on the tasks that depend most heavily on this ability such as Block Building, Puzzle Solving, Tapping Sequence, and Draw-A-Design, but does well on Conceptual Grouping, Draw-A-Child, and Right-Left

Orientation, it may be suspected that the child has well-developed nonverbal concepts and reasoning skills that are masked on tests which place a premium on coordination. They suggested that to verify this possible strength, the WISC-R Picture Completion subtest, which demands little coordination, may be given.

If there is some question on possible strengths and weaknesses revealed on the Quantitative Scale, the WISC-R Arithmetic subtest is recommended for verification. Finally, Kaufman and Kaufman (1977) suggested that Motor hypotheses concerning possible strengths or weaknesses may be verified or clarified by using the WISC-R Coding subtest.

The correlation between these different subtests of the McCarthy and the recommended WISC-R subtests suggested by Kaufman and Kaufman (1977) for verification of strengths and weaknesses will be investigated.

### Hypotheses

1. There is a significant positive correlation between the WISC-R Full Scale IQ score and the McCarthy GCI.
2. There is a significant positive correlation between the WISC-R Verbal score and the McCarthy GCI.
3. There is a significant positive correlation between the WISC-R Performance score and the McCarthy GCI.
4. There is a significant positive correlation between the WISC-R Verbal IQ score and the McCarthy Verbal Score.

5. There is a significant positive correlation between the WISC-R Performance IQ score and the McCarthy Perceptual-performance score.

6. There is a significant positive correlation between the WISC-R Vocabulary subtest score and the McCarthy Verbal Fluency score.

7. There is a significant positive correlation between the WISC-R Arithmetic subtest score and the McCarthy Number Questions score.

8. There is a significant positive correlation between the WISC-R Arithmetic subtest score and the McCarthy Numerical Memory II score.

9. There is a significant positive correlation between the WISC-R Arithmetic subtest score and the McCarthy Numerical Memory I score.

10. There is a significant positive correlation between the WISC-R Arithmetic subtest and the McCarthy Counting & Sorting score.

11. There is a significant positive correlation between the WISC-R Arithmetic subtest score and the McCarthy Quantitative score.

12. There is a significant positive correlation between the WISC-R Vocabulary subtest score and the McCarthy Word Knowledge score.



13. There is a significant positive correlation between the WISC-R Similarities subtest score and the McCarthy Opposite Analogies score.

14. There is a significant positive correlation between the WISC-R Comprehension subtest score and the McCarthy Word Knowledge, Verbal Memory II, and Verbal Fluency Index.

15. There is a significant positive correlation between the WISC-R Information subtest score and the McCarthy Verbal Index.

16. There is a significant positive correlation between the WISC-R Picture Completion subtest score and the McCarthy Block Building, Puzzle Solving, Tapping Sequence, Draw-A-Design, Conceptual Grouping, Draw-A-Child, and Right-Left Orientation.

17. There is a significant positive correlation between the WISC-R Coding subtest score and the McCarthy Motor Index.

#### Limitations of the Study

The McCarthy Scales were administered to the children approximately nine months to a year before the WISC-R was administered. Although ideally the tests would have been administered with a shorter interval between the two testing sessions, it is not uncommon for one instrument to be compared with another with this amount or a longer elapsed time between the administrations of the instruments. One advantage of the longer time between tests is that there is not likely to be any practice effect on items which are similar on the two

instruments. Although there are no duplicate items on the two instruments, there are some items for which practice on the McCarthy could possibly inflate the WISC-R score or vice versa. The length of time between the administration of the two instruments would eliminate this possible practice effect.

## CHAPTER II

### METHOD

#### Subjects

This study was conducted with students from four first-grade classes of St. Bethlehem Elementary School, Clarksville, Tennessee. The school principal and the Coordinator of Instruction of the Clarksville-Montgomery County School System gave permission for the study to be conducted at the St. Bethlehem School facility during regular school hours.

The original sample population were volunteers obtained by mailing letters to forty-three parents of first-grade children who had been tested during their kindergarten year with the McCarthy Scales. The parents had been sent a letter during the initial McCarthy testing explaining the nature of that study and requesting permission for their children to participate in an ongoing study which would be continued throughout their elementary school years.

The children in the original sample were administered the McCarthy in the spring of their kindergarten year by Stokes, Marrero, and Tramill (1978). All children in the original study who were enrolled in the same school in January of their first-grade year were given the WISC-R by the author.



### permission Form

A letter explaining the purpose of the study and requesting parental permission was forwarded to the parents of the original sample of children who were still enrolled in the school in the first grade at the time of this study.

Parents whose children participated in the study were told that information about their child's score was confidential and that no results would be placed in their child's record. They were informed that personal information could be received on an individual basis upon request. A copy of the letter is included in Appendix A.

### Description of the Instruments

The McCarthy and the WISC-R are individual intelligence tests. The McCarthy Scales are designed to assess several areas of a child's cognitive and motor development from the age of  $2\frac{1}{2}$  to  $8\frac{1}{2}$  years. The McCarthy Scale is comprised of 18 short tests that are grouped in various ways to form six scales: Verbal, Perceptual-Performance, Quantitative, General Cognitive Index, Memory, and Motor (McCarthy, 1972).

The Verbal (V) and Perceptual-Performance (P) Scales measure a variety of semantic and nonverbal skills, respectively, which are similar to the Verbal-Performance dichotomy used by Wechsler. The tests constituting the Verbal Scale are Pictorial Memory, Word Knowledge, Verbal Fluency, and Opposite Analogies.

The tests included in the Perceptual-Performance Scale are Block Building, Puzzle Solving, Tapping Sequence, Right-Left Orientation, Draw-A-Design, Draw-A-Child, and Conceptual Grouping.

The Quantitative (Q) Scale assesses basic arithmetic concepts, oral problem solving, and memory for digits. The Quantitative tests are Number Questions, Numerical Memory I & II, and Counting and Sorting.

The V, P, and Q Scales, which do not overlap in terms of content, make up the GCI. The GCI is a standard score with a mean of 100 and a standard deviation of 16. The V, P, and Q scores are scaled scores with a mean of 50 and a standard deviation of 10.

Two other scores are obtained from the McCarthy which are not included in the GCI, the Memory and the Motor Scales. The Memory Scale assesses short-term memory in both the visual and auditory modalities via verbal and nonverbal responses and with a wide variety of stimuli. The tests constituting the Memory Scale are also included on either the Verbal, Perceptual-Performance, or the Quantitative Scale. They are Pictorial Memory, Tapping Sequence, Verbal Memory and Numerical Memory. The Motor Scale assesses coordination and includes fine motor as well as non-cognitive gross-motor tests. The tests included on the Motor Scale are Leg Coordination, Arm Coordination, Imitative Action, Draw-A-Design, and Draw-A-Child.

The McCarthy was standardized on a representative, nationwide sample based on 1970 census data. A total of 1032 children comprised the normative group, with 100 to 106 youngsters tested at each of 10 age levels between  $2\frac{1}{2}$  and  $8\frac{1}{2}$  years of age. In addition to age, the sample was stratified on the basis of sex, race, father's occupation, geographic region, and urban vs. rural residence (McCarthy, 1972).

The WISC-R is an individual intelligence test which was constructed to test children aged six through sixteen years. The test consists of 10 regular subtests and two supplementary or optional subtests. Six subtests measure verbal abilities and six measure performance abilities. Full Scale IQ scores are obtained from the ten regular subtests; five verbal and five performance. The IQ scores obtained from the test are deviation IQ scores with a mean of 100 and a standard deviation of 15. The scaled scores obtained on the subtests have a mean of 10 and a standard deviation of 3.

The 10 regular subtests include Information, Comprehension, Arithmetic, Similarities, Vocabulary, Coding, Picture Completion, Picture Arrangement, Block Design, and Object Assembly. The two supplementary or optional subtests are Digit Span and Mazes.

The Verbal Scale IQ score is derived from the Information, Comprehension, Arithmetic, Similarities, and Vocabulary subtests. The Digit Span subtest is an original Verbal subtest and is not used in computing the Verbal IQ score.



Sattler (1974) has described the abilities which are evaluated by the different WISC-R subtests. The Information subtest measures the wealth of available information acquired as a result of native ability and early cultural experiences. The Comprehension subtest measures social judgment which is considered to be the ability to use facts in a pertinent, meaningful, and emotionally relevant manner. The Arithmetic subtest is purported to measure the ability to reason, along with concentration and numerical accuracy in mental arithmetic. The Similarities subtest measures logical abstract thinking. The Vocabulary subtest measures word knowledge, verbal fluency, receptive and expressive abilities. The Digit Span subtest measures attention and short-term memory.

The Performance Scale IQ score is derived from Picture Completion, Picture Arrangement, Block Design, Object Assembly, and Coding subtests. The Mazes subtest is an optional Performance subtest and is not used in computing the Performance IQ score.

Picture Completion measures the ability to differentiate essential from non-essential details and requires concentration, visual organization, and visual memory. The Picture Arrangement subtest measures nonverbal reasoning ability such as the ability to comprehend and size-up a total situation. The Block Design subtest measures visual-motor coordination and perceptual organization. The Object Assembly subtest

measures perceptual organization ability. The Coding subtest measures visual-motor coordination, speed of mental operation, and short-term memory. The Mazes subtest measures planning ability and perceptual organization.

The standardization sample of the WISC-R, in accordance with the 1970 United States Census, was stratified on several variables: age, sex, race (White-Nonwhite), geographic region, occupation of head of household, and urban-rural residence. A total of 2200 children comprised the normative group, with 200 children in each of eleven age groups, ranging from  $6\frac{1}{2}$  through  $16\frac{1}{2}$  years.

#### Procedure

Each child was administered the McCarthy and the WISC-R. The McCarthy tests were administered individually by five well trained examiners. The WISC-R was administered by the author who had been trained in the administration of the test. The scoring on all examinations were rechecked by another trained person. The children were administered the WISC-R approximately nine months to a year after the McCarthy had been administered.

## CHAPTER III

### RESULTS

A computer was utilized using the Pearson-Product Moment technique to determine the correlation coefficients. Critical values were determined with a one-tailed test. The coefficients were computed from the standard scores on each instrument. The total scores used for the WISC-R were Full Scale, Verbal, and Performance IQ scores and for the McCarthy, the GCI was used. The subtests scores were the scaled scores on the WISC-R and the weighted raw scores on the McCarthy.

The mean score and standard deviations of the WISC-R Full Scale, Verbal, and Performance IQ scores were 105.2 and 13.59; 102.6 and 16.88; and 106.9 and 9.03, respectively, as shown in Table 1. The mean GCI and standard deviation were 112.3 and 12.52, respectively. The values of the correlation coefficients for the first ten hypotheses are reported in Table 1. Correlation coefficients of .296, .409, and .560 are necessary for significance at the .05, .01, and the .001 levels of significance, respectively. A confidence level of at least .05 was considered significant, although the .01 and the .001 levels are reported. The correlations between the various subtests named in the first ten hypotheses are reported in Table 1. The number rather than the name of the tests is shown in Table 1. The name of the test followed by the appropriate number is used in the discussion of the results.



Table 1

## Relationship between Selected McCarthy and WISC-R Subtests Scores

	1	2	3	6	7	18	28	29	30	31	34	35	37	Mean	S.D.
1											.724***		.764***	102.594	16.879
2												.548**	.708***	106.875	9.034
3													.797***	105.125	13.587
6						.570***	.366*	.223		.236				10.219	2.558
7									.423**					10.938	3.553
18				.570***										12.000	2.915
28				.366*										7.000	1.369
29				.223										7.188	3.601
30					.423**									18.75	5.477
31				.236										8.750	1.541
34	.724***													55.063	8.835
35		.548**												57.844	8.159
37	.764***	.708***	.797***											112.313	12.516

\*  $p < .05$ , one-tailed test\*\*  $p < .01$ , one-tailed test\*\*\*  $p < .001$ , one-tailed test

Hypotheses 1, 2, and 3 stated that there is a significant positive correlation between the WISC-R Full Scale (3), the WISC-R Verbal (1), and the WISC-R Performance (2) IQ scores and the McCarthy GCI (37). The correlations obtained of .797, .764, and .708, respectively, support the hypotheses.

Hypothesis 4 stated that there is a significant positive correlation between the WISC-R Verbal (1) and the McCarthy Verbal score (34). The obtained correlation of .724 supports the hypothesis.

Hypothesis 5 stated that there is a significant positive correlation between the WISC-R Performance (2) subtest and the McCarthy Perceptual-Performance score (35). The obtained correlation of .548 supports the hypothesis.

Hypothesis 6 stated that there is a significant positive correlation between the WISC-R Vocabulary subtest score (7) and the McCarthy Verbal Fluency score (30). The obtained correlation of .423 supports the hypothesis.

Hypothesis 7 stated that there is a significant positive correlation between the WISC-R Arithmetic score (6) and the McCarthy Number Questions score (18). The obtained correlation of .570 supports the hypothesis.

Hypothesis 8 stated that there is a significant positive correlation between the WISC-R Arithmetic subtest score (6) and the McCarthy Numerical Memory II score (29). The obtained correlation of .223 fails to support the hypothesis.

Hypothesis 9 stated that there is a significant positive correlation between the WISC-R Arithmetic subtest score (6) and the McCarthy Numerical Memory I score (28). The obtained correlation of .366 supports the hypothesis.

Hypothesis 10 stated that there is a significant positive correlation between the WISC-R Arithmetic subtest score (6) and the McCarthy Counting & Sorting score (31). The obtained correlation of .236 fails to support the hypothesis.

The values of the correlations coefficients for hypotheses eleven through seventeen are reported in Table 2. These hypotheses were investigating the relationship between the subtests from the WISC-R to verify possible strengths and weaknesses found on the McCarthy as suggested by Kaufman and Kaufman.

Hypothesis 11 stated that there is a significant positive correlation between the WISC-R Arithmetic (6) subtest score and the McCarthy Quantitative score (36). The obtained correlation of .591 supports the hypothesis.

Hypothesis 12 stated that there is a significant positive correlation between the WISC-R Vocabulary (7) subtest score and the McCarthy Word Knowledge score (17). The obtained correlation of .637 supports the hypothesis.

Hypothesis 13 stated that there is a significant positive correlation between the WISC-R Similarities subtest (5) score and the McCarthy Opposite Analogies score (32). The obtained correlation of .395 supports the hypothesis.



Table 2

Relationship Between McCarthy and WISC-R Subtests Suggested for Diagnostic Purposes

		4	5	6	7	8	9	13	14	15	17	19	21	22	26	27	30	32	33	34	36	39
<u>WISC-R</u>																				.348*		
Information	4										.637***		.020				.411**	.395*				
Similarities	5																				.591***	
Arithmetic	6																					
Vocabulary	7										.637***											
Comprehension	8										.649***		.327*				.491**					
Picture Completion	9								.306*	.201		.213		.198	.148	.080			.087			
Coding	13																					.211
<u>McCarthy</u>																						
Block Building	14																					
Puzzle Solving	15																					
Word Knowledge I & II	17		.637***			.553**		.649***														
Tapping Sequence	18											.213										
Verbal Memory II	21		.020					.327*														
Right-Left Orientation	22											.198										
Draw-A-Design	26											.148										
Draw-A-Child	27											.080										
Verbal Fluency	30										.491**											
Opposite Analogies	32																					
Conceptual Grouping	33																					
Verbal (V)	34																					
Quantitative (Q)	36																					
Motor	39																					

\*p &lt; .05, one-tailed.

\*\*p &lt; .01, one-tailed.

\*\*\*p &lt; .001, one-tailed.

Hypothesis 14 stated that there is a significant positive correlation between the WISC-R Comprehension subtest score (8) and the McCarthy Word Knowledge (17), Verbal Memory II (21), and Verbal Fluency (30). The obtained correlations of .637, and .491 between the WISC-R Comprehension subtest (8) score and the McCarthy Word Knowledge (17) and Verbal Fluency (30) respectively, support the hypothesis. The obtained correlation of .327 between the WISC-R Comprehension subtest score (8) and the McCarthy Verbal Memory II (21) fails to support the hypothesis.

Hypothesis 15 stated that there is a significant positive correlation between the WISC-R Information subtest score (4) and the McCarthy Verbal Index (34). The obtained correlation of .348 supports the hypothesis.

Hypothesis 16 stated that there is a significant positive correlation between the WISC-R Picture Completion subtest score (9) and the McCarthy Block Building (14), Puzzle Solving (15) Tapping Sequence (19), Draw-A-Design (26), Conceptual Grouping (33), Draw-A-Child (27), and Right-Left Orientation (22). The obtained correlations of .306, .201, .213, .148, .087, .080, and .198 fail to support the hypothesis.

Hypothesis 17 stated that there is a significant positive correlation between the WISC-R Coding subtest score (13) and the McCarthy Motor Index (39). The obtained correlation of .211 fails to support the hypothesis.

## CHAPTER IV

### DISCUSSION

The purpose of this study was to generate further data on the relationships between WISC-R scores and McCarthy scores, specifically, on a sample of six-to-seven-year old students.

In spite of the fact that McCarthy deliberately avoids the term IQ for the purpose of avoiding the "...many misinterpretations of the concept" (McCarthy, 1972, p. 5), two investigators (Davis and Walker, 1977; McCarthy, 1974) using normal children, as opposed to a learning disabled population, suggest that there is no real distinction between the IQ and the GCI, which McCarthy prefers to use. In the present study, the GCI of 112.3 was approximately 10 points higher than the WISC-R Verbal, 5 points higher than the WISC-R Performance, and 7 points higher than the WISC-R Full Scale IQ scores. Davis and Walker (1977) reported a difference of approximately two points between the three WISC-R IQ scores and the GCI, with the McCarthy scores lower in each instance. McCarthy (1974) reported a difference of approximately two points between the WPPSI Full Scale and the GCI, again with the McCarthy the lower of the two scores. Kaufman and Kaufman (1974) found the mean GCI approximately 15 points lower than the IQ scores earned on the RSB and WISC with a group of children identified as having minimal brain dysfunction. De Boer, et al. (1975),



comparing GCI's and IQ scores from the WISC, WPPSI, or RSB, also found a 16 point discrepancy with the IQ scores on the higher scores. Although no studies were found comparing the WISC-R IQ scores with McCarthy GCI's, the higher scores found on the McCarthy with this sample of normal children is not consistent with the findings reported in the previous comparisons of the GCI with IQ scores from other instruments. It would be difficult to say whether this discrepancy between the scores is a result of lower IQ scores being earned on the WISC-R than on the other instruments yielding IQ scores or whether this age child scores higher on the McCarthy as compared to other age groups.

The correlations found between the WISC-R Verbal, Performance, and Full Scale IQ scores and the GCI were all significant in this study, as were those found in the only study in the literature comparing these two instruments (Davis and Walker, 1977). The Full Scale, Verbal, and Performance IQ score correlations with the GCI were .797, .764, and .708, respectively, whereas the Davis and Walker (1977) correlation coefficients in the same order were .75, .65, and .62. Although the coefficients were slightly higher on all three comparisons in the present study, all studies mentioned above were consistent in finding the GCI and the Full Scale IQ score with the highest correlation and the Performance IQ score with the

lowest correlation with the GCI.

Harrison and Wiebe (1977) reported correlation coefficients of .74, .59, and .73, respectively, between the Full Scale, Verbal, and, Performance IQ scores of the WISC and the GCI. Thus, in this study, the correlation between the WISC-R Performance and Full Scale scores and the McCarthy is higher than the correlation between the WISC-R Verbal IQ score and the McCarthy GCI.

The literature (Brooks, 1977: Hamm, Wheeler, McCallum, Herrin, Hunter, and Catoe, 1976; Hartlage and Steele, 1977; Stokes, Brent, Huddleston, Marrero, and Rozer, 1978) has indicated that, generally, scores are lower on the WISC than on the WISC-R. The present findings thus would indicate that the WISC-R and the McCarthy are measuring the same skills to a greater degree than are the WISC and the McCarthy.

McCarthy (1974) used the Wechsler test for younger children, the WPPSI, in the comparisons reported in her manual. She found correlations of .63, .62, and .71 between the Verbal, Performance, and Full Scale IQ scores, respectively, and the GCI. Her reported correlations are in the same directions as the present study, with the correlation between the Full Scale score and the GCI being highest and the correlation between the Performance and GCI being the lowest of the three correlation coefficients. Thus, it appears that the McCarthy is measuring much the same kinds of abilities that are measured

in the combined Wechsler scales rather than on the Verbal or performance scales alone. This would be expected as the McCarthy includes both verbal and performance type items.

There are no equivalent studies in the literature comparing the WISC-R scores with the Verbal scale of the McCarthy. McCarthy (1974) reported a correlation coefficient of .51 between the Verbal scale of the McCarthy and the WPPSI Verbal IQ score. Harrison and Wiebe (1977) reported a correlation coefficient of .42 between the Verbal scale of the McCarthy and the WISC Verbal IQ score. The frequently reported correlation between the McCarthy Verbal scale and the WISC-R Verbal IQ score was .724. The data from all three studies suggest that the McCarthy Verbal Scale is more highly correlated with the WISC-R Verbal IQ than with the other Wechsler Verbal IQ scores. There were no reported studies in the literature comparing the WISC-R scores with the Perceptual-Performance Scale of the McCarthy. McCarthy (1974) reported a correlation coefficient of .59 between the McCarthy Perceptual-Performance Scale and the WPPSI Performance IQ score. The greatest correlation between the McCarthy Perceptual-Performance Scale and the WISC-R was .548.

There are no reported studies in the literature comparing the WISC-R Vocabulary subtest score with the McCarthy Verbal Fluency score. In the present study a correlation of .423 is reported, which suggests that these subtests are measuring similar abilities.



The findings of the present study suggest that many of the subtests on the McCarthy and the WISC-R are measuring similar abilities as evaluated in Hypotheses 6 through 11. All comparisons of the subtests from the McCarthy and the WISC-R which would be expected to measure the same abilities from descriptions of the contents and purposes of the subtests did show significant positive correlations, with the exception of two comparisons. The two comparisons which did not yield significant correlation coefficients, specifically, between the WISC-R Arithmetic score and the McCarthy Numerical Memory II score and the WISC-R Arithmetic score and the McCarthy Counting & Sorting score suggest that these subtests appear to be measuring different abilities or skills. However, the total Quantitative score as reported in Hypothesis 11, was found to be significantly related to the WISC-R Arithmetic score.

Therefore, according to the findings of this study, if one wanted to measure the same abilities on the McCarthy that were being evaluated by the WISC-R Arithmetic subtest, it would be more appropriate to use the McCarthy Number Questions, Numerical Memory II or the Full Quantitative score.

Hypotheses 11-17 were investigating the recommended use of subtests from the WISC-R to verify possible strengths and weaknesses as recommended by Kaufman and Kaufman (1977). (Hypothesis 11 was also considered in the comparisons of selected subtests).

They had suggested the use of the WISC-R Vocabulary and Similarities subtests to verify hypotheses regarding good verbal concept formation, as measured by the Opposite Analogies and Word Knowledge subtests of the McCarthy. The correlations found between these subtests were not significant suggesting that different kinds of abilities are required for the tasks. The suggestion of verifying good verbal concept formation by administering the WISC-R Vocabulary and Similarities subtests was not supported by the present findings.

If a child does poorly on Word Knowledge, Verbal Memory II, and Verbal Fluency, Kaufman and Kaufman (1977) suggested that a verbal expressive problem may exist. In such a case, they recommended administering additional tasks requiring expressive skills, one of which was the WISC-R Comprehension subtest. The correlations between the WISC-R Comprehension subtest and the McCarthy Word Knowledge and Verbal Fluency were significant suggesting that a possible verbal expressive ability is being measured by these subtests. The suggestion by Kaufman and Kaufman (1977) for verification by using the WISC-R Comprehension subtest in such a case is supported. The correlation between the WISC-R Comprehension subtest and the McCarthy Verbal Memory II was not found to be significant which, suggests that different kinds of abilities are being measured. In such a case, the suggestion for the use of the

WISC-R Comprehension subtest for verification is not supported. They noted that if an expressive problem does exist, then the child's Verbal Index may not adequately reflect his verbal intelligence. In such a case, the WISC-R Information subtest which requires less verbalization is recommended. The correlations between these two subtests shows that there is a significant positive correlation which suggests that the WISC-R Information subtest may not require less verbalization, at least to a discernible degree, than the McCarthy Verbal Index. If such were true, one would expect the correlation between the two subtests not to be significant. Therefore, Kaufman and Kaufman's (1977) suggestion of using the WISC-R Information for this purpose is questionable.

Kaufman and Kaufman (1977) further stated that if a child evidences awkward fine motor coordination and does poorly on the tasks that depend most heavily on this ability such as Block Building, Puzzle Solving, Tapping Sequence, and Draw-A-Design but he does well on Conceptual Grouping, Draw-A-Child and Right-Left Orientation, it may be suspected that the child has well-developed nonverbal concepts and reasoning skills that are masked on tests which place a premium on coordination. They suggest administering the WISC-R Picture Completion subtest demanding little coordination for verification of his possible strength. On the basis of Kaufman and Kaufman's (1977) suggestion for verification there



should not be a significant positive correlation between the WISC-R Picture Completion subtest and the McCarthy Block Building, Puzzle Solving, Tapping Sequence, and Draw-A-Design, but there should be a significant positive correlation between the WISC-R Picture Completion subtest and the McCarthy Conceptual Grouping, Draw-A-Child and Right-Left Orientation. The obtained correlations were not significant for either comparison. Therefore, using the WISC-R Picture Completion subtest for verification if a child does poorly on McCarthy Block Building, Puzzle Solving, Tapping Sequence and Draw-A-Design, but he does well on the McCarthy Conceptual Grouping, Draw-A-Child and Right-Left Orientation is not supported.

Kaufman and Kaufman (1977) suggested that if there is some question on possible strengths and weaknesses revealed on the Quantitative Scale, the WISC-R Arithmetic subtest is recommended for verification. The obtained correlation was significant which suggest that similar abilities are required for the tasks. Therefore, the suggestion for verification is supported.

Finally, Kaufman and Kaufman (1977) suggest that strengths and weaknesses related to motor hypotheses may be verified by using the WISC-R Coding subtest. The obtained correlation between these two tests was not significant which suggests that different kinds of abilities may be required for the tasks. In this case the suggestion for verification is not supported.

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The data from this study indicate that some of Kaufman and Kaufman's (1977) suggestions for administering specific subtests on the WISC-R for verification of strengths and weaknesses found on the McCarthy would probably be of value. However, all the suggestions made are not supported by this study.

## CHAPTER V

### SUMMARY and CONCLUSIONS

The purposes of this study were to determine if a relationship existed for the given population between the WISC-R and the McCarthy Full and subtests scores on the two instruments and to investigate the relationships between the WISC-R and the McCarthy subtests which appear to have a conceptual relationship. Also, hypothesized relations between the WISC-R and the McCarthy subtests purposed by Kaufman and Kaufman (1977) were investigated.

Thirty-two first graders from a public school in Clarksville-Montgomery County volunteered to participate in the study. All subjects were individually administered the McCarthy and the WISC-R. The scores from the WISC-R were collected from first grade children in the present study whereas the scores from the McCarthy were collected from the same sample when they were enrolled in kindergarten.

The statistical analysis of the data yielded the following conclusions:

Correlations between the McCarthy GCI and the WISC-R Verbal, Performance, and Full Scale IQ scores yielded significant coefficients at or beyond the .05 level of significance. Significant positive correlations were found between the WISC-R Verbal and Performance IQ scores and with the McCarthy Verbal and Perceptual-Performance scores.



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Significant positive correlations were found between the following WISC-R and McCarthy subtests which appear to have similar conceptual definitions:

Arithmetic and Number Questions; Vocabulary and Verbal Fluency; Arithmetic and Numerical Memory I; and, the Arithmetic and Counting & Sorting subtests. Only one of the subtest pairs investigated among the first ten hypotheses, namely, the WISC-R Arithmetic subtest and the McCarthy Numerical Memory II scores did not show significance.

Kaufman and Kaufman (1977) suggested a number of hypotheses regarding relationships between the WISC-R and the McCarthy Scales and also suggesting various uses of the WISC-R subtests to supplement information derived from the McCarthy. The correlations between selected WISC-R and the McCarthy subtests scores obtained, in the present study, supported some of the Kaufmans' hypotheses but failed to provide evidence for others.

As stated earlier, correlational studies are conducted in order to determine the relationship between tests, to investigate the similarities or differences of scores earned on the instruments and/or to attest to the superiority or inferiority of one instrument over the other for predictive purposes. The purpose of this study was to show if a relationship existed between the McCarthy and the WISC-R for the given population. The conclusions support the existence of a relationship.

The purpose of determining the superiority or inferiority of one instrument over the other was not addressed in the study. It can be seen, however, from the present study, and studies conducted by others, that in some cases the McCarthy and the WISC-R appear to be measuring similar abilities. It would be amiss, in the author's opinion, to say that the McCarthy offers nothing new in the assessment of children. The McCarthy is designed to evaluate the capacities of young children under six years of age and the WISC-R is not. The McCarthy has been highly recommended for screening of kindergarten children to determine need for special help or intervention in a child's educational career. It contains a Motor Scale and a Memory Scale which are not included on the WISC-R.

Because the McCarthy may be viewed as a complement to the WISC-R, it would be of value to use the Full McCarthy score and subtest scores to verify or support low or high scores found on the WISC-R, using the subtests that show a significant correlation, to increase the reliability of diagnostic interpretation from the WISC-R.

#### Recommendations for Further Research

Based on the existing literature and the results of this study, the following needs for further study are indicated:

1. More indepth studies investigating the justification for using a particular subtest on the WISC-R to verify findings from the McCarthy or vice versa.

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2. A need for further studies with different age groups comparing the WISC-R and the McCarthy.

3. A need for further study of the learning disabled populations using the McCarthy test.

4. A need for predictive studies of school success from the two instruments to see if one is a better predictor of school success.



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## REFERENCES

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APPENDIX A

January 16, 1979

TO: Parents of First Grade Children in McCarthy Study  
St. Bethlehem School

FROM: Bernie Marrero, School Psychologist  
Elizabeth H. Stokes, APSU

Again, we appreciate your cooperation in allowing your child to take part in the study of the McCarthy Scales of Children's Abilities during his/her kindergarten year. As you remember, we asked for permission to have your child in the study, so we could follow him or her through the next few years of school. We also mentioned that we planned to do some retesting in the spring. We have decided to start retesting a little earlier, mid-January.

A graduate student will be doing the retesting of your child on a different test called The Wechsler Intelligence Scale for Children-Revised (WISC-R). This test is basically the same as the McCarthy Scales of Children's Abilities. The graduate student will be administering this test to compare the performance on the McCarthy with the performance on the WISC-R of your child and of other children who were tested last year.

If you have any questions about your child continuing to participate in this testing please contact Mr. Marrero at 647-5681.

Thank you again for your help and the help of your child.

BM/EHS:paw