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The Relationship Between Attention and Memory and School Readiness in West Virginia Preschoolers

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Abstract

The Relationship Between Attention and Memory and Academic Readiness in West Virginia Preschoolers

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The current study investigated the relationship between memory and attention and academic readiness in children between the ages of 2 ½ and 5. Forty-two preschool children were involved in the study and were selected from childcare centers participating in the Educare project in West Virginia. All subjects were tested with the Bracken and the Carolina Curriculum. The Bracken measured the academic readiness and the Carolina Curriculum measured memory and attention levels of the children. The results indicated a positive correlation between memory and attention and academic readiness. The findings supported the position that there is a positive correlation between mastery of attention and memory and academic readiness. Further research is recommended to determine an appropriate role, if any, memory and attention can play in academic readiness at different age levels.

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The Relationship Between Attention and Memory and Academic Readiness in West Virginia Preschoolers

Introduction

Single parent and two income families are increasing and, therefore, the numbers of children in childcare are increasing. During the past 150 years, the family economy was revolutionized twice, first as fathers and then mothers left the home to spend much of the day away at jobs. In 1995, 59 percent of children who were five years or younger were in non-parental care arrangements on a regular basis (Hofferth, Shauman, Henke, & West, 1998).

The national policy is to move people from welfare to work and this, too, will increase the numbers of children in childcare. Therefore, it is imperative that quality childcare is available for every child. McCartney (1995) reported that children in good-quality childcare centers had better academic development than their peers in lower-quality child care centers.

The Kids Count Data Book (1999) reported that West Virginia had 441 licensed childcare centers and 4% of the licensed centers were accredited. The national average for accredited centers was 17%, which places West Virginia below the national average. Accredited childcare centers meet national standards in a variety of areas: ratio of staff to student, level of education of staff, outside area, and activities. Furthermore, Kids Count found that 49.5 percent of all eligible West Virginia three and four year olds, or 6,610 children were enrolled in Head Start in 1999. This is greater than the national average of

40.5% but over half of the eligible preschool students are still not enrolled (West Virginia Kids Count, 1999).

West Virginia Educare Project (WVE) was established to improve preschool opportunities for children in West Virginia. The WVE will establish standards for quality early learning programs and provide funding to meet the standards. WVE plans to enhance and build on current early childhood programs and policies to strengthen rather than replace existing services. Enrollment in WVE programs is voluntary and available to any WV child on a part-or-full time basis when the child lives in an area served (WV Educare, 1998).

Zill, Collins, West & Hauksken (1995) found a majority of children start kindergarten with some experience in center-based programs (such as child care centers or preschools), but the percentage of children with such experience and the quality of these experiences vary because economic and environmental factors vary.. Attending Head Start, pre-kindergarten, or other center-based preschool programs was linked to higher emerging literacy scores in 4-year-olds (Zill, et al). This correlation remained statistically significant even when other child and family characteristics were taken into account. This benefit of preschool attendance accrued to children from both high-risk and low risk family backgrounds (Zill et al).

West Virginia Educare Project was established to identify the functioning level of West Virginia preschoolers and their academic readiness. Early brain development research has found that ninety-five percent of a child's brain is developed by age three

(West Virginia Kids Count, 1999). Intelligence is a function of both genetics and the environment and it is important to remember that environmental factors are thought to be responsible for about half of our differences in intelligence. High quality childcare promotes optimal brain development and increases intelligence for life (West Virginia Kids Count).

The child who gets little attention from his child care teacher, who has few toys to play with and is seldom talked to or listened to is experiencing an adverse environment, which shapes the way the child's brain is growing and how intelligent the child will be (West Virginia Kids Count). Therefore, quality childcare will increase the chances a child will learn and grow. West Virginia Educare Project will attempt to identify the factors necessary for children to acquire memory and attention and academic readiness.

The U.S. Senate Committee on Governmental Affairs established The National Goals Panel, which articulated that school readiness is composed of…cognition and general knowledge, (Shaul, 2000). West Virginia Educare Project tested preschool children using the Carolina Curriculum for Preschoolers and the Bracken to articulate the functioning level of the preschoolers. The subsection of The Carolina Curriculum for Preschoolers (attention and memory) was used to assess the attention and functioning levels of attention and memory. The Bracken used the first six subsections to obtain academic readiness of the children.

The general knowledge of a child is built on the information that he is exposed to and the ability to recall this information. Therefore, quality childcare centers need to

create an environment of exposure to activities that enhance a child's ability to recall information for school. Also the childcare center should create an environment for a child who is easily bored and helpless to keep his or her mind on task. As a rule, preschool children usually have very short attention spans and normally do not persist with activities for long periods of time (Lambert & Sandoval, 1989). Cantwell and Satterfield found that children who exhibit high levels of inattention and distractibility have difficulty with memory related tasks (Cantwell & Satterfield, 1987; Holborrow & Berry, 1986; McKinney, Mason, Perkerson, & Clifford, 1975).

In a self-report study the U. S. Department of Education (1993) asked parents to rate the extent to which their child showed signs of difficulties in physical activity, attention, and the extent of the child's readiness skills (U.S. Department of Education, 1993). The U.S. Department of Education Study (1993) reported that 8 out of 10 four-year-olds could identify primary colors by name. Zill, et al, reported fewer than 6 out of 10 could count to 20 or recognize most letters of the alphabet. Difficulties with short attention span and restlessness were reported in about 1 in 4 (Sill, Collins, West & Hausken, 1995).

The present study assessed the relationship between memory and attention and academic readiness. Children with attention and behavior problems are at risk for a wide range of social, emotional and cognitive difficulties (Kazdin, 1987; Robins, 1981; Szatmari, Boyle & Offord, 1989). A subtest on the Carolina Curriculum for Preschoolers assessed the child's attention and memory level and the SRC of the Bracken assessed the

children's' academic readiness skills. It is hypothesized that there will be a significant relationship between memory and attention and academic readiness.

Methods

Subject:

Educare sites located in Cabell/Wayne, Monongalia, Webster, Roane and Upshur counties submitted a list of children attending each site. The sample consisted of N=42 children from sites listed above. The subjects were 2 ½ to 5 years of age, both male and female.

Instrumentation

The children were assessed using the Bracken-R (SRC subtest) and Carolina Curriculum for Preschoolers (memory and attention subtest). The preschool teacher completed the Carolina Curriculum for Preschoolers. A subtest scale consisting of 20 items on The Carolina Curriculum labeled attention and memory was used to measure memory and attention. The Bracken-R can be used to assess a broad range of complex memory and reasoning abilities. However, to measure academic readiness, the Bracken--subsets 1 through 6-- were used.

Bracken-R

The Bracken-R is used to measure a broad range of complex memory and reasoning abilities including those leading to internal processes of verbal (symbolic) mediation as well as those that are less conductive to such mediation (nonsymbolic). The school readiness composite of the Bracken is a good indicator of the academic

preparation a child has received prior to beginning formal schooling. The school readiness composite (SRC) is a collection of six subtests to access conceptual knowledge that is very closely aligned with early childhood educational curricula (i.e., colors, letters, numbers and counting sizes, comparisons, and shapes) (Braken 1998).

Standardization

The Bracken-R was standardized through a carefully designed stratified random sampling plan; the result was a sample that closely matches the U.S. population according to 1995 census data. Bracken (1998) reported that normative data were collected from a comprehensive national sample of 2,100 children and adolescents from the ages of 5 years 0 months through 17 years 11 months. Data were collected in 108 sites across 38 states. A total of 3,865 children and adolescents were examined. The following nine variables were used to select participants for the standardization sample: age, sex, race, Hispanic origin, region, community setting, classroom placement, special education services, and parental education (Bracken, 1998).

The scores for subtests 1 through 6 are treated collectively as the SRC score for several reasons. First, collective treatment makes sense intuitively because these subtests represent the "readiness" concepts that parents, preschool and kindergarten programs have traditionally taught children in preparation for formal education. Second, the SRC should be treated as a composite of subtests composed of concepts that many people teach children just prior to formal education in the belief that all children should have mastered these concepts when they begin school.

Reliability

The reliability of the BBCS-R was established two ways: internal consistency and test-retest stability. Dividing the test into parallel halves and correlating scores on the respective halves examined internal consistency. The median subtest and total test reliabilities are .94 and .985, respectively (Bracken, 1998).

Test-retest reliability is another method of estimating the reliability of the test by examining test-retest stability. The stability of an instrument is measured by administering the instrument to a group of children and, at some later date, readministering the test (test-retest reliability). The test-retest reliability of the Bracken was evaluated based on the performance of 114 children in the standardization sample who took the test on two separate occasions with the same examiner. The sample was drawn from three age groups (3,5 and 7). Test-retest reliability for the total test was .94 (Bracken, 1998).

Validity

A test is considered valid if it measures what it purports to measure (Bracken, 1998). Panter (2000) evaluated the validity of the tryout version of the Bracken Basic Concept Scale-Revised (BBC-R) as a predictor of kindergarten children's performance in the Metropolitan Readiness Test-Sixth Edition (MR.T-6). The tryout version of the BBCS-R was administered to 71 kindergarten students in the fall of the school year. Seven months later, the MR.T-6 was administered to the same students. The BBCS-R was found to be a good predictor of children's performance on the MR.T-6. Further, the BBCS-R School Readiness Composite (SRC), a ten-minute screening instrument,

accounted for 45 to 52 percent of the variance in the MRT-6 scores. This study validated the use of the BBCS-R in general, and the SRC in particular, as valid screening measures to predict academic achievement (Panter, 2000).

A second study evaluated a screening battery to predict the school performance of kindergarten children (Panter, 2000). At the start of the school year, 71 students were administered the Bracken Basic Concept Scale-Revised, the Geometric Design of the Wechsler Preschool and Primary Scale of Intelligence-Revised and the Parent Form of the Social Skills Rating System. Their performance on these measures were used to predict the following outcome measures: retention or referral for services, teacher ratings of first grade readiness, rating on the Academic Competence Scale of the SSRS, and scores on the Metropolitan Readiness Test-Sixth Edition.

Carolina Curriculum for Preschoolers

The Carolina Curriculum for Preschoolers (CCPSN) is designed for children in the two-year to five-year development range. It can be administered in the childcare center based programs. It includes an assessment log and development progress charts for children two to five years, which are completed by the classroom teacher. The CCPSN assesses cognition, communication, special adaptation, fine motor, and gross motor skill. Special needs options include attention and memory, motor, and hearing.

The Carolina Curriculum for Preschoolers focuses on 25 specific domains of development, providing a detailed picture of a child's functioning. One of the subtests on The Carolina Curriculum for Preschoolers is used to measure attention and memory

("Anticipates part of rhymes or songs," "Repeats 2 digit sequences or 2 unrelated words," "Identifies from 4 or more pictures seen only briefly"). It is a "hands on" curriculum tool that enables teachers to identify effective intervention techniques for use in the preschool classroom and to plan individual preschool programs for children with special needs.

The Carolina Curriculum has among the best technical data of any curriculum in terms of reliability and validity (Johnson-Martin, Atteneier, & Hacker, 1990). Further, the curriculum is high in authenticity and emphasizes many naturally occurring tasks.

Procedure

The children selected for the study were male and female preschoolers between the age of 2 1/2 and 5 years attending child care centers participating in the West Virginia Educare pilot. During an approximated six-month period the selected children were evaluated using the Bracken-R, Carolina Curriculum (CCPSN), and Peabody Picture Vocabulary Test (PPVT). The ECERS-R was used to evaluate the preschool classroom environment of the children.

For the current study, the data from the Bracken -- the student readiness subsection -- and The Carolina Curriculum for Preschoolers subsection on memory and attention were collected (See appendix). A correlation coefficient was then computed to determine the strength and relationship between memory and attention and academic readiness. The study will use the results to determine if any correlation exists between memory and attention and academic readiness.

Results

There was a positive correlation between attention and memory and academic readiness. The collected data was entered in the statistical base and a Pearson Product Moment correlation (Table 1) showed with $N = 42$, $r(10) = .388$, $p < .01$. The significance level was .659 (two-tailed).

Discussion

In the current study, the SRC composite and the Carolina Curriculum memory and attention scales were compared. It was hypothesized that memory and attention and school readiness would be a high positive correlation. The results of this study, however, indicated that memory and attention and school readiness has a correlation but it was not as high as expected. Previous research on memory and attention and academic readiness is consistent with a high positive correlation.

The problem with the present study is a correlation study is limited since no cause and effect can be determined. It is difficult to determine whether attention and memory caused increases in academic readiness or academic readiness caused children to have increased memory and attention. Previous research has concluded that there is a high positive correlation between memory and attention and academic readiness. The present study found that a positive correlation indicating memory and attention played a role in academic readiness. As hypothesized, the children with high memory and attention skills score better on academic readiness measures. Future studies could determine the precise extent to which memory and attention and school readiness is

affected by age grouping.

There are factors that may have limited the results of the current study. First, the beginning sample was much larger, but because of incomplete data on several Carolina Curriculum assessment logs, those results were deleted in order to run a Pearson Product Moment correlation. Second, the Bracken was administered several months before the Carolina Curriculum due to delays in teacher training. As a result, pressure may have been exerted upon the teachers to quickly fill out the forms to meet the established time limits to receive educare funds. Also, children's developmental growth is accelerated during the preschool years.

In explaining these findings, it could be said that the selection process of the childcare centers where the children were located confounded these results. The childcare centers applied for a grant and as a condition of receiving this grant participated in the study. Further the children were chosen because the parents sent in a permission slip that gave the child care center permission to test their child.

For future research it would be useful to train teachers to use the Carolina Curriculum earlier and more extensively before conducting assessments of children. The importance of accuracy and timely completion of the Carolina Curriculum assessment logs and developmental forms should be stressed to teachers to ensure validity and reliability of measures.

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TABLE 1

TABLE 1a SRC Composite Standard

Pearson Correlation	.388(**)	1.000
Sig. (2-tailed)	.659	
N	42	42

**Correlation is significant at the 0.01 level (2-tailed)

TABLE 1b Frequencies Statistics

	Standard Score	SRC Composite Standard
Valid	42	42
Missing	0	0
Mean	101.93	105.0536
Std. Deviation	10.96	13.1196

TABLE 1c Bracken

Correlations	Mean	Std. Deviation	N
Total 20 CC	11.40	10.00	42
Standard Score	98.12	9.74	42

Mean and Standard Deviations for Memory and Attention subset of the Carolina Curriculum and the School Readiness Subset of the Bracken-R

Test	Mean	Standard Deviation
Memory and Attention (CCR)	98.12	9.74
School Readiness (Bracken)	101.93	10.96

Appendix A

ASSESSMENT LOG

Insert the date of your assessment at the top of the column and insert a + in the box for each mastered item.

Age (Years)	Curriculum Sequences	Date:	Date:	Date:	Date:
	1. Attention and Memory				
	a. Anticipates parts of rhymes or songs				
	b. Repeats 2-digit sequences or 2 unrelated words				
	c. Points to the hand that is hiding a toy				
(2.5)	d. Joins in saying nursery rhymes—repeats parts of them				
	e. Tells the name of an object or picture shown briefly in a group of 2 and then hidden				
	f. Remembers incidental information (e.g., "What did you see at the zoo?")				
	g. Repeats 3-word sentences				
(3)	h. Says or sings at least 2 nursery rhymes or songs in a group or with an adult				
	i. Identifies from 4 or more pictures 1 seen only briefly				
	j. Names 1 of several (e.g., 4 or more) objects or pictures, shown, named, and then hidden				
	k. Repeats a sequence of 3 digits or 3 unrelated words				
(3.5)	l. Repeats 4-word sentences including adjectives				
	m. Remembers and names which of 3 objects has been hidden				
	n. Describes familiar objects without seeing them				
	o. Recalls 1 or 2 elements from a story just read (no prompts)				
(4)	p. Matches both color and shape of an object (or picture) seen only briefly				
	q. Sings songs or says rhymes of at least 30 words (words may be repeated)				
	r. Recalls 3–4 elements from a story without prompts				
	s. Matches both color and shape of 2 objects (or pictures) seen only briefly				

Age (Years)	Curriculum Sequences	Date:	Date:	Date:	Date:
(4.5)	t. Describes events that happened in the past (e.g., yesterday, last week)				
	u. Recalls most of the essential elements in a story				
	v. Repeats 5–6-word sentences, maintaining the grammatical structure				
	w. Repeats sequence of 4 numbers or unrelated words				
(5)	x. Remembers the place in an array where a picture was seen only briefly (e.g., 5 seconds)				

Appendix B

Directions for Subtests 1–6

Administer Subtests 1–6 beginning with the first item in each subtest. Some of the stimulus pages are used for more than one item. Administer the items in sequence until the child misses three consecutive items (the ceiling), then continue with the first item of the next subtest. Circle the 1 if the child responds correctly; circle the 0 if the child responds incorrectly. Add the number of correct responses to subtotal individual subtests.

Subtest 1. COLORS

Say, *"Look at all of the colors. Show me which color is..."*

Item	Response		Score
1. **black**	_____	NR	1 0
2. **green**	_____	NR	1 0
3. **pink**	_____	NR	1 0
4. **blue**	_____	NR	1 0
5. **white**	_____	NR	1 0
6. **orange**	_____	NR	1 0
7. **yellow**	_____	NR	1 0
8. **red**	_____	NR	1 0
9. **purple**	_____	NR	1 0
10. **brown**	_____	NR	1 0
11. **gray**	_____	NR	1 0

Subtotal ____

Subtest 2. LETTERS

Say, *"Look at all of the letters. Show me..."*

Item	Response		Score
1. the **A**	_____	NR	1 0
2. the **X**	_____	NR	1 0
3. the **S**	_____	NR	1 0
4. the **W**	_____	NR	1 0
5. the **H**	_____	NR	1 0
6. the **K**	_____	NR	1 0
7. the **Q**	_____	NR	1 0
8. the **D**	_____	NR	1 0
9. the **z**	_____	NR	1 0
10. the **m**	_____	NR	1 0
11. the **i**	_____	NR	1 0
12. the **b**	_____	NR	1 0
13. the **e**	_____	NR	1 0
14. the **t**	_____	NR	1 0
15. the **g**	_____	NR	1 0
16. the **j**	_____	NR	1 0

Subtotal ____

Subtest 3. NUMBERS/COUNTING

Say, *"Look at all of the pictures. Show me ..."*

Item	Response		Score
1. **one** bear	1 2 3 4	NR	1 0
2. **nine** bumblebees	1 2 3 4	NR	1 0
3. the **one**	_____	NR	1 0
4. the **three**	_____	NR	1 0
5. the **two**	_____	NR	1 0
6. the **four**	_____	NR	1 0
7. the **zero**	_____	NR	1 0
8. **six** ducks	1 2 3 4	NR	1 0
9. **three** flowers	1 2 3 4	NR	1 0
10. the **five**	_____	NR	1 0
11. the **seven**	_____	NR	1 0
12. the **eight**	_____	NR	1 0
13. the **nine**	_____	NR	1 0
14. the **six**	_____	NR	1 0
15. the **forty-one**	_____	NR	1 0
16. the **ninety-five**	_____	NR	1 0
17. the **eleven**	_____	NR	1 0
18. the **fifty-three**	_____	NR	1 0
19. the **twenty-seven**	_____	NR	1 0

Subtotal ____

Subtest 4. SIZES

Say, *"Look at all of the pictures. Show me ..."*

Item	Response		Score
1. which animal is **big**	1 2 3 4	NR	1 0
2. which ball is **little**	1 2 3 4	NR	1 0
3. which dog is **small**	1 2 3 4	NR	1 0
4. which candle is **tall**	1 2 3 4	NR	1 0
5. which water is **deep**	1 2 3 4	NR	1 0
6. which rope is **long**	1 2 3 4	NR	1 0
7. which rabbit has **short** ears	1 2 3 4	NR	1 0
8. which vase is **thin**	1 2 3 4	NR	1 0
9. which rope is **short**	1 2 3 4	NR	1 0
10. which rock is **large**	1 2 3 4	NR	1 0
11. which boat is **wide**	1 2 3 4	NR	1 0
12. which water is **shallow**	1 2 3 4	NR	1 0

Subtotal ____

Subtest 5. COMPARISONS

Say, *"Look at all of the pictures. Show me ..."*

Item	Response	Score
1. which boxes are **not the same**	1 2 3 4 NR	1 0
2. which fruit are **different**	1 2 3 4 NR	1 0
3. which puzzle pieces fit **exactly**	1 2 3 4 NR	1 0
4. which shoes **match**	1 2 3 4 NR	1 0
5. which boats are **alike**	1 2 3 4 NR	1 0
6. which balloons are the **same**	1 2 3 4 NR	1 0
7. which person is reading something **other than** a book	1 2 3 4 NR	1 0
8. which animals are **similar**	1 2 3 4 NR	1 0
9. which cans are of **equal** size	1 2 3 4 NR	1 0
10. which glasses have **unequal** amounts of juice	1 2 3 4 NR	1 0

Subtotal ☐

Subtest 6. SHAPES

Say, *"Look at all of the pictures. Show me ..."*

Item	Response	Score
1. the **star**	_____ NR	1 0
2. the **heart**	1 2 3 4 NR	1 0
3. which children are in a **line**	1 2 3 4 NR	1 0
4. the **circle**	_____ NR	1 0
5. the **cone**	1 2 3 4 NR	1 0
6. which one is **round**	1 2 3 4 NR	1 0
7. the **square**	_____ NR	1 0
8. the **triangle**	_____ NR	1 0
9. which ducks are in a **row**	1 2 3 4 NR	1 0
10. the **diamond**	_____ NR	1 0
11. the **oval**	_____ NR	1 0
12. the **rectangle**	_____ NR	1 0
13. the **check mark**	1 2 3 4 NR	1 0
14. the **cylinder**	1 2 3 4 NR	1 0
15. the **curve**	1 2 3 4 NR	1 0
16. the **cube**	1 2 3 4 NR	1 0
17. the **pyramid**	1 2 3 4 NR	1 0
18. the **column**	1 2 3 4 NR	1 0
19. the **diagonal**	1 2 3 4 NR	1 0
20. the **angle**	1 2 3 4 NR	1 0

Subtotal ☐

Determine the Start Point for Subtests 7–11

Step 1

Add the raw score subtotals from Subtests 1–6 to determine the child's School Readiness Composite (SRC) raw score.

Subtest Subtotals

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

SRC Raw Score _____

Step 2

Use the SRC raw score to determine the start point (starting items) for Subtests 7–11. Scan across the Start Point Table below to locate the range of numbers that includes the child's SRC raw score. The letter below the SRC raw score represents the point at which you should begin to administer items in Subtests 7–11. Circle the Start Point letter and begin Subtest 7 with the item that corresponds to that letter.

Start Point Table

SRC Raw Score	0–20	21–30	31–37	38–48	49–59	60–70	71–75	76–79	80–82	83–84	85–88
Start Point	A	B	C	D	E	F	G	H	I	J	K