DOCUMENT RESUME

ED 329 561 TM 016 077

AUTHOR Smith, Douglas K.; Knudtson, Lenore S.
TITLE K-ABC and S-B:FE Relationships in an At-Risk Preschool Sample.
PUB DATE Aug 90
NOTE 15p.; Paper presented at the Annual Meeting of the American Psychological Association (98th, Boston, MA, August 10-14, 1990).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Academic Achievement; *At Risk Persons; Comparative Testing; Correlation; Disabilities; Factor Analysis; *Intelligence Tests; Memory; Nonverbal Ability; *Preschool Children; Preschool Education; *Psychological Testing; *Scores; Verbal Ability
IDENTIFIERS *Kaufman Assessment Battery for Children; *Stanford Binet Intelligence Scale Fourth Edition

ABSTRACT

The Kaufman Assessment Battery for Children (K-ABC) and the Stanford-Binet: Fourth Edition (S-B:FE) were administered in counterbalanced order to a sample of 20 middle-class preschool children (11 males and 9 females) attending the Early Childhood Preschool Center located in a suburban area of a large midwestern city. Subjects' mean age was 4 years and 9 months. All children attending the center had been identified as at-risk for impeded future academic progress. Potentially handicapping conditions included both physical and educational difficulties. Subjects' global scale scores as well as the K-ABC supplementary scales (as proposed by R. Kamphaus and C. Reynolds) and the S-B:FE factor scores (as proposed by J. Sattler) were compared. The K-ABC Mental Processing Composite and the S-B:FE Test Composite produced a correlation of 0.79, while the K-ABC Global Intelligence Composite and the S-B:FE Test Composite correlation was 0.81. Although significant correlations were present for scales on the two tests that are purported to measure memory, non-verbal reasoning, verbal skills, and achievement, there were significant differences in global scale means of the two tests. The utility of the proposed supplementary scales and factor scores with at-risk preschool students are discussed. Three tables present study data. (Author/SLD)

K-ABC and S-B:FE Relationships in an At-Risk Preschool Sample

Douglas K Smith and Lenore S. Knudtson

School Psychology Program

University of Wisconsin-River Falls

Paper presented at Annual Meeting of American Psychological Association, Boston, August 1990.

Running head: K-ABC/SB:FE

Abstract

The Kaufman Assessment Battery for Children and the Stanford-Binet: Fourth Edition were administered in counterbalanced order to a sample of 20 at-risk, preschool children (11 males and 9 females). Mean age was four years and nine months. Global scale scores as well as the K-ABC supplementary scales (as proposed by Kamphaus and Reynolds) and the S-B:FE factor scores (as proposed by Sattler) were compared. The K-ABC Mental Processing Composite and the S-B:FE Test Composite produced a correlation of .79 ($p < .001$) while the K-ABC Global Intelligence Composite and the S-B:FE Test Composite correlation was .81 ($p < .001$). Although significant correlations ($p < .05$) were present for scales on the two tests that are purported to measure memory, nonverbal reasoning, verbal skills and achievement, there were significant differences in global scale means of the two tests. Utility of the proposed supplementary scales and factor scores with at-risk preschool students is discussed.

As preschool assessment has assumed greater importance and emphasis, such tests as the Kaufman Assessment Battery for Children (K-ABC; A. Kaufman & N. Kaufman, 1983) and the Stanford-Binet Intelligence Scale: Fourth Edition (S-B:FE; Thorndike, Hagen & Sattler, 1986) are being examined more closely for use with both at-risk and nonhandicapped preschool students. At the same time new approaches to interpretation of these tests have been developed. Kamphaus and Reynolds (1987) have developed a procedure for computing a Verbal Intelligence Composite (VIC) and a Global Intelligence Composite (GIC) for the K-ABC. At the preschool level, the VIC is comprised of the achievement tests (Expressive Vocabulary, Faces & Places, Arithmetic and Riddles) and the GIC is formed by equally weighting the scores on the Simultaneous (SIM), Sequential (SEQ) and VIC scales. Meanwhile, Sattler (1988) has proposed the use of factor scores rather than area scores for interpretation of the S-B:FE. These factor scores are of interest as Sattler (1988, p. 261) argues that since the "area scores are not supported by factor analysis, they should not be used for most interpretive purposes." At the preschool level there are two factors: Verbal Comprehension (VC), composed of Vocabulary, Comprehension, Absurdities and Memory for Sentences, and Nonverbal Reasoning/Visualization (NVR), composed of Pattern Analysis, Copying, Quantitative and Bead Memory.

Validity studies comparing the K-ABC and S-B:FE with handicapped preschool children are limited. Studies reported in

the Technical Manual for the S-B:FE suggest a substantial correlation between the K-ABC and S-B:FE. Results, however, were not broken down by age range. Studies with at-risk preschool students (e.g., Krohn & Lamp, 1987) have also shown strong correlations between the two tests.

Purpose of the Study

Studies examining the new interpretive approaches proposed by Kamphaus and Reynolds (1987) and Sattler (1988) are lacking. In addition, studies exploring the relationship of the K-ABC and S-B:FE to each other in preschool samples are limited. Therefore, the present study was designed to examine the relationships among the K-ABC and S-B:FE in an at-risk, preschool sample.

Method

Subjects

The sample consisted of 20 middle class children (11 males and 9 females) attending the Early Childhood Preschool Center located in a suburban area of a large midwestern city. All children attending the Center had been identified as "at-risk" for impeded future academic progress. Potentially handicapping conditions included both physical and educational difficulties. The parents of the 25 children attending the Center were asked to participate in the study. The parents of 20 children (80%) agreed to participate. Parent educational level ranged from high school to post college with the majority of parents having a college degree. The children ranged in age from 3 years, 10 months to 5 years, 6

months with a mean age of 4 years, 9 months.

Procedure

Each child was administered the K-ABC and S-B:FE in counterbalanced order by school psychologists trained in the administration and interpretation of the tests. Average length of time between tests was three days with a range of two to seven days.

Results and Discussion

Mean scores on the K-ABC ranged from 89.65 (VIC) to 98.05 (SIM) and on the S-B:FE from 83.55 (Short Term Memory; STM) to 94.90 (Verbal Reasoning; VR). The wide range in scores (from low to high) reflects the diversity of the "at-risk" children attending the preschool program. The means, standard deviations and range for the global scales of each test are presented in Table 1.

Insert Table 1 about here

Pearson product moment correlations were calculated separately for each test and for both tests with each other. All K-ABC global scale intercorrelations were significant and ranged from .38 (SIM/ACH) to .96 (MPC/GIC). The VIC and GIC correlations with the global scales of the K-ABC were similar in magnitude to the ACH and MPC correlations with the same global scales. On the S-B:FE all global scales correlated significantly with the TC at a level consistent with the correlations reported for four year olds in the

standardization sample. The VC factor proposed by Sattler (1988) produced similar correlations to the TC and area scores as the VR area score. The NVR factor score, however, produced somewhat different correlations than its counterpart, the AVR area score. The correlations for both tests are presented in Table 2.

Insert Table 2 about here

The K-ABC results suggest that the SIM and SEQ scales are measuring somewhat different aspects of intelligence while being highly related to overall intelligence (MPC, GIC). Likewise, the ACH scale is measuring behavior that is different from that measured by the processing scales. The GIC and VIC correlations with the global scales upon which they are based (MPC and ACH, respectively) suggest substantial overlap in the constructs measured. Use of VIC or ACH, with this sample of at-risk preschool children, appears to be a difference in terminology rather than a difference in the constructs measured. On the S-B:FE the factors proposed by Sattler, VC and NVR, produced similar correlations with each other ($r = .69$) as produced by the original area scores, VR and AVR ($r = .62$). Likewise, the relationships of the factor scores, VC and NVR, to the Test Composite were similar to the relationships of the area scores, VR and AVR, to the Test Composite. The NVR factor score produced somewhat different correlations with the other area scores as compared to its counterpart, the AVR area score.

In comparing the two tests, the most meaningful comparisons are among those scales purportedly measuring similar cognitive skills including memory, nonverbal reasoning, verbal reasoning, achievement and overall cognitive development. Specifically, these involve SEQ with STM (.78, $p < .001$); SIM with AVR (.63, $p < .001$); SIM with NVR (.72, $p < .001$); ACH with QR (-.23, NS); ACH with VR (.70, $p < .001$); ACH with VC (.71. $p < .001$); VIC with VR (.79, $p < .001$); VIC with VC (.79 $p < .001$); MPC with TC (.79, $p < .001$); and GIC with TC (.81, $p < .001$). These results suggest that both tests are measuring memory and nonverbal reasoning in similar ways and that the achievement construct seems to have much overlap with verbal skills.

The QR area score on the S-B:FE produced negative correlations with the K-ABC ACH and VIC scales as well as with the VR area score of the S-B:FE. Since these correlations are based on scores of 14 children only, they should be viewed cautiously. It should be noted, however, that numerous children had difficulty understanding the instructions for the Quantitative subtest. Thus, their scores may reflect this difficulty rather than deficits in the skills assessed by the subtest itself. Since the QR area score at this level is based on this subtest alone, examiners should exercise caution in the interpretation of test results. In some cases it may be appropriate to eliminate this subtest and area from the battery for at-risk preschool children. The complete table of

intercorrelations is presented in Table 3.

Insert Table 3 about here

Differences in mean global scale scores for similar constructs were analyzed by t-tests for related samples. Significant results were obtained for the memory construct with SBQ > STM ($t = 3.69$, $p < .001$), the nonverbal reasoning construct with SIM > AVR ($t = 2.63$, $p < .01$) and SIM > NVR ($t = 3.65$, $p < .01$), the verbal skills construct with VIC < VR ($t = 2.90$, $p < .01$) and for overall cognitive construct with MPC > TC ($t = 2.69$, $p < .01$) and GIC > TC ($t = 2.02$, $p < .05$). K-ABC global scales measuring memory/sequential processing, nonverbal reasoning and overall cognitive development were significantly higher than their S-B:FE counterparts. In the verbal skills area, the reverse was true with the S-B:FE VR scale producing a higher score than the K-ABC VIC. Thus, the at-risk preschool child with strong verbal skills may receive higher scores on the S-B:FE, as compared to the K-ABC,. The at-risk preschool child with poorly developed verbal skills, however, may receive higher scores on the K-ABC as compared to the S-B:FE. These possible differences appear to reflect the differing orientation of the two test with the S-B:FE being more verbal than the K-ABC.

Conclusions

In this sample of at-risk preschool children, the K-ABC and S-B:FE demonstrated substantial overlap in the constructs measured. Mean global scale scores were significantly higher on the K-ABC in the areas of memory/sequential processing, nonverbal reasoning and overall intellectual development. In the verbal area, the S-B:FE produced significantly higher mean scores. The K-ABC supplementary scales, VIC and GIC, related strongly to their original counterparts, ACH and MPC, and appeared to reflect a difference in terminology rather than a difference in the constructs measured. The factor scores suggested by Sattler for the S-B:FE correlated with the Test Composite at the same level as the corresponding area scores. The VC factor and VR area score exhibited substantial overlap with each other while the NVR factor produced somewhat different correlations with the other area scores as compared to its counterpart, the AVR area score. Finally, the Quantitative subtest of the S-B:FE was difficult for many at-risk preschool children to comprehend. Examiners are advised to consider omitting this subtest from the battery as it is the only subtest used to calculate the QR area score.

References

Kamphaus, R., & Reynolds, C. (1987). Clinical and research applications of the K-ABC. Circle Pines, MN: American Guidance Service.

Kaufman, A., & Kaufman, N. (1983). The Kaufman Assessment Battery for Children. Circle Pines, MN: American Guidance Service.

Krohn, E., & Lamp, R. (1987). Validity of the K-ABC and Binet-Fourth Edition for low income preschool children. New Orleans, LA. (Paper presented at annual meeting of National Association of School Psychologists)

Sattler, J. (1988). Assessment of children (3rd ed.). San Diego: Jerome M. Sattler, Publisher.

Thorndike, R., Hagen, E., & Sattler, J. (1986). Stanford-Binet Intelligence Scale: Fourth Edition. Chicago: Riverside Publishing.

Table 1

Means, standard deviations and ranges for global scales on the K-ABC and S-B:FE

K-ABC	Mean	Standard Deviation	Range
Mental Processing Composite (MPC)	93.70	17.74	64-127
Sequential Processing (SEQ)	89.95	14.46	62-122
Simultaneous Processing (SIM)	98.05	20.01	71-132
Achievement (ACH)	90.85	13.20	71-122
Verbal Intelligence Composite (VIC)	89.65	12.66	68-119
Global Intelligence Composite (GIC)	91.00	14.82	64-119
S-B:FE			
Test Composite (TC)	87.05	11.98	63-109
Verbal Reasoning (VR)	94.90	12.47	70-111
Abstract/Visual Reasoning (AVR)	88.90	13.45	67-113
Quantitative Reasoning	93.85	7.38	84-106
Short Term Memory (STM)	83.55	11.84	60-105
Verbal Comprehension (VC)	87.70	11.14	65-106
Nonverval Reasoning/Visualization (NVR)	86.50	12.26	61-111

n= 20 except for Quantitative Reasoning in which n = 14

Table 2

Intercorrelations for the K-ABC and S-B:FE global scales

K-ABC

	SEQ	SIM	ACH	VIC	GIC
MPC	.82*	.94*	.49**	.50**	.96*
SEQ		.57**	.54**	.49**	.83*
SIM			.38**	.43**	.87*
ACH				.96*	.71*
VIC					.72*

S-B:FE

	VR	AVR	QR	STM	VC	NVR
TC	.87*	.81*	.56**	.79*	.85*	.96*
VR		.62**	-.03	.70*	.92*	.71*
AVR			.40***	.40**	.47**	.84*
QR				.35***	.06	.73*
STM					.85*	.73*
VC						.69*

n = 20 except for QR correlations in which n = 14

*p < .001 **p < .01 ***p< .001

Abbreviations:

K-ABC: MPC = Mental Processing Composite; SEQ = Sequential Processing; SIM = Simultaneous Processing; ACH = Achievement; VIC = Verbal Intelligence Composite; GIC = Global Intelligence Composite

S-B:FE: TC = Test Composite; VR = Verbal Reasoning; AVR

= Abstract/Visual Reasoning; QR = Quantitative Reasoning; STM = Short Term Memory; VC = Verbal Comprehension; NVR = Nonverbal Reasoning/Visualization.

Table 3

Intercorrelations among the K-ABC and S-B:FE scales

	MPC	SEQ	SIM	ACH	VIC	GIC
S-B:FE						
TC	.79*	.66*	.73*	.55**	.61**	.81*
VR	.67*	.55**	.63**	.70*	.79*	.77*
AVR	.62**	.43***	.63*	.20	.24	.56**
QR	.46***	.26	.52***	-.23	-.39	.28
STM	.61**	.78*	.40***	.59**	.60**	.68*
VC	.71*	.70*	.59**	.71*	.79*	.81*
NVR	.76*	.62**	.72*	.41***	.44***	.73*

n = 20 except for QR correlations in which n = 14.

*p < .001 **p < .01 ***p < .05

Abbreviations:

K-ABC: MPC = Mental Processing Composite; SEQ = Sequential Processing; SIM = Simultaneous Processing; ACH = Achievement; VIC = Verbal Intelligence Composite; GIC = Global Intelligence Composite

S-B:FE: TC = Test Composite; VR = Verbal Reasoning; AVR = Abstract/Visual Reasoning; QR = Quantitative Reasoning; STM = Short Term Memory; VC = Verbal Comprehension; NVR = Nonverbal Reasoning/Visualization.