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ABSTRACT

Stability of K-ABC (Kaufman Assessment Battery for Children) performance of 33 nonhandicapped and 53 at-risk preschool children was examined over a 9- to 12-month period. A high level of stability for global scale scores as well as subtest scores was indicated for both groups of children. (PCB)

Stability of Cognitive Performance among Nonhandicapped and At-risk Preschoolers

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Running head: STABILITY

Abstract

Stability of K-ABC performance over a nine to twelve month interval with 33 nonhandicapped and 53 at-risk preschool children was examined. Global stability coefficients (corrected for restriction in range) were: MPC = .73, SEQ = .71, SIM = .66 and ACH = .91 for the nonhandicapped group and MPC = .88, SEQ = .84, SIM = .79 and ACH = .87 for the at-risk children (who were enrolled in an early intervention program). Results of t-tests for related samples indicated that mean Time 2 scores were significantly higher than mean Time 1 scores on all K-ABC global scales for the at-risk group with MPC and SIM significantly higher for the nonhandicapped group and ACH significantly lower. A high level of stability for both global scale scores and subtest scores was indicated for both groups of preschool children.

In the past few years the identification of preschool children who are at risk for academic failure from a variety of handicapping conditions has become an issue of increasing concern (Lichtenstein & Ireton, 1984). In addition, the focus of preschool assessment has changed to include not only diagnosis but also the design of appropriate intervention strategies (Kelley & Surbeck, 1983).

The stability of cognitive performance among preschool children on scales of intelligence, however, has received little attention. Of the several recent studies that have examined stability of performance (Covin & Sattler, 1985; Telzrow, Proefrock & Hartlage, 1985, August; Valencia, 1985), only two have used preschool samples. Telzrow et al.'s study included 26 preschool children (identified as high-risk infants) tested at ages 3, 4, 5 and 6 with either the Stanford-Binet Intelligence Scale: Form L-M (Terman & Merrill, 1960) or the Wechsler Preschool and Primary Scale of Intelligence (WPPSI; Wechsler, 1967). Correlations with age 6 Binet IQ ranged from .48 with age 5 Binet IQ to .56 with age 4 WPPSI IQ. Valencia's study involved 42 Mexican-American children enrolled in a Head Start program and tested with the Kaufman Assessment Battery for Children (K-ABC; A. Kaufman & N. Kaufman, 1983) in Spring 1983 and retested in Fall 1983. Global scale stability coefficients ranged from .76 to .90.

As new scales for preschool assessment are developed, it is important that the stability of performance on these instruments be examined. How stable are the scores obtained by preschool children? For what length of time are the scores stable? Since these instruments are used to identify handicapped and at-risk students, stability of scores must be examined with samples of these students as well as samples of nonhandicapped students.

The present study, therefore, was designed to investigate stability of the K-ABC by using two samples of students from a suburban midwestern community: (a) nonhandicapped preschoolers and (b) students enrolled in a preschool early intervention program. Specifically, stability of both global scale scores and subtest scores was investigated with students tested at an interval of nine to twelve months.

Method

Subjects

Subjects for the study consisted of 33 nonhandicapped and 53 at-risk preschool children. The nonhandicapped sample consisted of 15 males and 18 females who were randomly selected from those students successfully passing the school district's screening program for four year olds. At time of initial testing ages ranged from 44 months to 58 months (mean = 49.9; standard deviation = 3.8). The at-risk sample included 38 males and 15 females who had been placed in the preschool program after evaluation with either the McCarthy Scales or Stanford-Binet (Form L-M). These evaluations resulted from the child scoring in the lower 10% of children during the district's screening program for four year old children. At time of initial testing the at-risk students ranged in age from 49 months to 73 months (mean = 57.11; standard deviation = 7.6). All students were white and from middle class backgrounds.

Procedure

The nonhandicapped sample was formed by randomly selecting parents of students scoring in the upper 90% of children during the district's preschool screening program and asking them to participate in the study. Participation rate in this phase of the study was 95%. The K-ABC was then administered to each child during the summer (Time 1) and readministered the following summer (Time 2). Parents of all children enrolled in the preschool program were asked to participate in the study and 90% agreed to do so. The at-risk sample was administered the K-ABC in early September (Time 1) and again in late May (Time 2). All testing was performed by licensed school psychologists or school psychology interns who had been trained in the administration and interpretation of the K-ABC. All protocols were checked for scoring accuracy before being included in data analysis. (Results of the K-ABC were not used in any placement decisions).

In order to determine stability coefficients, Pearson product moment correlations were calculated for Time 1 and Time 2 scores for each group. These correlations were corrected as needed for restriction in range using the procedure developed by Guilford (1954). In addition, t-tests for related samples were performed in order to determine the comparability of scores from Time 1 to Time

2 testing for each group of students.

Results

Time 1 scores on the global scales of the K-ABC were consistently in the above average range for the nonhandicapped group and in the below average range for the at-risk group. Time 2 scores were generally higher for both groups of students. Mean scores and standard deviations are reported in Table 1.

Insert Table 1 about here

Stability coefficients for the K-ABC global scales, as presented in Table 1, were significant ($p < .001$) for both the nonhandicapped and at-risk groups and ranged from .66 to .91. T-tests for related samples, as shown in Table 1, indicated that for the nonhandicapped group Mental Processing Composite (MPC) and Simultaneous (SIM) means were significantly higher and Achievement (ACH) was significantly lower at Time 2 testing. For the at-risk group all global scale means (MPC, Sequential (SEQ), SIM and ACH) were significantly higher at Time 2 testing.

Similar analyses were conducted with the K-ABC subtest scores and these results are presented in Table 2.

Insert Table 2 about here

Discussion

Stability coefficients for the K-ABC global scales were consistently high for both groups of students with seven of eight coefficients greater than .70 and the other coefficient at .66. For both groups the ACH and MPC scales produced the highest stability coefficients. Although the coefficients for the at risk group were higher than those for the nonhandicapped group, the differences were not statistically significant and may represent chance occurrences. A high degree of stability in scores is indicated for both the at-risk and nonhandicapped groups of students, a finding similar to the results obtained by Valencia (1985) using the K-ABC with a sample of Mexican-American Head Start children. This level of stability occurred even though the subtests on the SIM, MPC and ACH scales changed as a function of the children's ages. On the SIM scale, Magic Window and Face Recognition were replaced by Matrix Analogies and Spatial Memory and the stability coefficients were still quite high, .66 (nonhandicapped) and .78 (at-risk). Likewise on the ACH scale, Expressive Vocabulary was replaced by Reading/Decoding and the stability coefficients were .91 (nonhandicapped) and .87 (at-risk). Although these results need to be supported by other studies with differing samples, preliminary indications are that the measurement of the constructs represented by the global scales has not been compromised by varying the subtest composition of the scales and that the K-ABC does provide continuity of measurement at this preschool age range (approximately four to six years).

For the nonhandicapped sample, very modest increases in mean scores on the MPC and SIM scales and a modest decrease on the ACH scale occurred over the twelve month period. These changes in mean global scale scores averaged three to four points and their practical significance is questionable. The decline in ACH for the nonhandicapped group was the result of not increasing the number of correct answers provided to each of the achievement subtests, as raw scores at Time 2 were within one or two points of raw scores at Time 1 for almost every child. Much larger changes were noted for the at-risk group in which strong increases were noted on all four global scales. These increases in score ranged from 2.3 points on SEQ to 9.4 points on SIM. All increases were significant ($p <$ .001). With nine months having elapsed between test times, practice effects do not seem to account for these changes in mean scores. Since the children were participating in a preschool program, the intervertion may have played a role in the increase in mean scores. Without a matched control group, however, such an interpretation is speculative at best and needs to be explored in future studies.

The pattern of gain scores obtained on the K-ABC mental processing global scales is similar to that obtained by Valencia (1985) with a sample of Mexican-American preschoolers enrolled in a Head Start Program. For both groups, the largest increases occurred on the SIM scale and the smallest on the SEQ scale.

Unlike the present study, a significant increase on the ACH scale was not indicated in Valencia's study. In addition, gain scores were of a higher magnitude in the present study as compared to Valencia's study.

Stability coefficients for individual subtests were consistent for both groups. Using r = .70 as a standard, 75% of the stability coefficients were high and indicated a marked relationship between Time 1 and Time 2 scores. Hand Movements was the only subtest below this standard for both groups (r = .59 for the nonhandicapped group and r = .65 for the at-risk group), while Gestalt Closure was below the standard for the nonhandicapped group (r = .52) and Number Recall for the at-risk group (r = .68). For both groups Triangles produced the highest stability coefficients among the mental processing subtests, while Faces & Places and Arithmetic yielded the highest stability coefficients among the achievement subtests. The stability coefficients for the at-risk group were similar to those obtained by Valencia (1985) with the exception of the stability coefficients for Hand Movements and Riddles which were higher in the present study (.65 vs .39 and .70 vs .26, respectively). Overall the results suggest a high level of stability over a nine to twelve month interval among individual subtests for both the nonhandicapped and at-risk preschool students in the present study.

Conclusions

The results of the present study with 33 nonhandicapped and 53 at-risk preschoolers indicate moderate to strong stability for K-ABC global scale scores and subtest scores for preschool age children (ages four to six). The pattern of results is similar to those of other studies as well as the test-retest results described in the K-ABC Interpretive Manual. Although larger gain scores were indicated in the at-risk sample, the stability coefficients for both groups were quite similar. The test-retest coefficients in the present study are relatively strong and provide additional evidence that the K-ABC is a stable measure for both nonhandicapped and at-risk preschool children. Since the test-retest span was only one year, further investigations over a longer time frame and with samples of different characteristics are needed. Evidence to date, however, indicates that the K-ABC is a stable measure for preschool children, both nonhandicapped and at-risk.

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Author Notes

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Table 1

Means, Standard Deviations, Correlations and t-test Results on the Global Scales of the K-ABC for Nonhandicapped and At-risk Preschoolers

	Time 1 Testing		Time 2 Testing			
	Mean	SD	Mean	SD	r	t
Nonhandicapped						
MPC	112.21	11.80	116.21	11.22	.73*	2.32***
SEQ	112.12	10.77	112.76	7.91	.71*	NS
SIM	109.49	12.10	114.70	13.41	.66*	2.55***
ACH	113.55	12.20	109.97	11.56	.91*	3.23***
At-risk Preschoolers						
MPC	85.98	12.03	93.04	12.14	.88*	7.29*
SEQ	86.87	10.48	89.21	10.86	.84*	2.31*
SIM	88.17	13.94	97.57	13.46	.78*	7.80*
ACH	89.11	12.70	92.59	12.18	.87*	3.46*

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

Note. MPC = Mental Processing Composite; SEQ = Sequential Processing; SIM = Simultaneous Processing; ACH = Achievement. All correlations have been corrected for restriction in range using the procedure developed by Guilford (1954). Degrees of freedom = 32 for nonhandicapped preschoolers and 52 for at-risk preschoolers.

Table 2

Means, Standard Deviations, Correlations and t-test Results on the Subtests of the K-ABC for Nonhandicapped and At-risk Preschoolers

	Time 1 Testing		Time 2 Testing			
	Mean	SD	Mean	SD	r	t
Nonhandicapped						
Hand Movements	11.64	2.22	11.48	2.00	.59*	.39
Gestalt Closure	11.61	2.76	12.09	2.60	.52**	1.01
Number Recall	11.97	2.29	12.09	1.73	.78*	.37
Triangles	12.04	2.31	12.88	3.13	.84*	1.89***
Word Order	12.29	2.18	12.29	1.52	.72*	.00
Faces & Places	107.45	14.11	105.42	11.48	.88*	1.45
Arithmetic	113.31	15.35	107.22	11.40	.82*	3.33**
Riddles	113.76	12.10	109.51	10.61	.80*	2.64**
At-risk Preschoolers						
Hand Movements	7.68	2.15	8.19	2.25	.65*	1.74
Gestalt Closure	8.11	3.63	10.13	3.35	.78*	6.30*
Number Recall	7.98	2.71	8.09	2.97	.68*	.34
Triangles	8.51	1.77	9.66	2.53	.79*	4.14*
Word Order	8.10	1.77	8.57	1.88	.74*	2.34***
Faces & Places	88.30	14.18	92.66	14.70	.77*	3.10**
Arithmetic	85.76	12.40	89.47	12.87	.77*	2.76**
Riddles	93.64	13.99	97.22	11.88	.70*	2.43***

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

Note. Degrees of freedom = 32 for nonhandicapped preschoolers and 52 for at-risk preschoolers. Correlations have been corrected for restriction in range as needed using Guilford's (1954) procedure.