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ABSTRACT

The stability of the Kaufman Assessment Battery for Children (K-ABC) was studied by examining its performance over a 5-year interval with 16 non-handicapped children aged 45 to 61 months at the beginning of the study. Global scale stability coefficients (corrected for restriction in range) for Time 1 testing (age 4 years) and Time 4 testing (age 9 years) were: (1) mental processing composite, 0.62; (2) sequential processing, 0.45; (3) simultaneous processing, 0.71; and (4) achievement, 0.63. Repeated measures analyses of variance revealed non-significant differences in global scale means across the four test times. The results indicate a high level of stability for global scale scores from preschool (age 4 years) to elementary age (age 9 years) and from age 6 to age 9 years. Analysis of performance patterns are discussed. There are two tables of study data and a five-item list of references. (SLD)

Stability of the K-ABC: A Five Year Longitudinal Study

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Running head: K-ABC STABILITY

Abstract

Stability of K-ABC performance over a five year interval with 16 nonhandicapped children was examined. Global scale stability coefficients (corrected for restriction in range) for Time 1 testing (age 4) and Time 4 testing (age 9) were: MPC = .62, $p < .01$; SEQ = .45, $p < .05$; SIM = .71 ($p < .001$); and ACH = .63, ($p < .01$). Repeated measures analyses of variance revealed nonsignificant differences in global scale means across the four test times. The results of the study indicated a high level of stability for global scale scores from preschool (age 4) to elementary age (age 9) and from age 6 to age 9. The results of the study including the analysis of performance patterns (SIM > SEQ, SIM < SEQ, or SIM = SEQ) are discussed.

The stability of performance among preschool and elementary age children on such instruments as the Stanford-Binet Intelligence Scale: Fourth Edition (SB:FE), the Wechsler Intelligence Scale for Children Revised (WISC-R), and the Kaufman Assessment Battery for Children (K-ABC) has received little attention. Of several recent studies that have examined stability of performance, only four (Lamp & Krohn, 1990)(Lyon & Smith, 1987)(Telzrow, Proefrock, & Hartlage, 1985)(Valencia, 1985) have included preschool samples.

Lamp and Krohn (1990) begain with 89 randomly selected Head Start children who were administered the K-ABC, SB:FE, and SB:LM at age four and retested two years later. They found the scores on the SB:FE and K-ABC to be highly stable from age 4 to age 6. Lyon and Smith (1987) utilized a sample of 53 at-risk preschool children who were tested with the K-ABC in the fall of the year and retested in the spring. Global scale stability coefficients ranged from .78 to .88. Telzrow et al (1985) employed a sample of 26 preschool children who had been identified as high-risk infants and were tested at ages 3, 4, 5, and 6 with either the Stanford-Binet or WPPSI. Correlations of Binet IQ at ae 6 ranged from .48 with Binet IQ at ages 5 to .56 with WPPSI IQ at age 4. Valencia's (1985) sample involved 42 Mexican-American children enrolled in a Head Start program. Each student was tested with the K-ABC in Spring 1983 and retested in Fall 1983. Over this time interval, global scale stability coefficients ranged from .76 to .90.

As new scales for preschool assessment are developed with many of them spanning the preschool and elementary age range, it is important that the stability of performance on the instruments be examined. The present study was designed to investigate K-ABC stability by using a sample of nonhandicapped children from a suburban, midwestern community.

Method

Subjects

The original sample was selected randomly from children successfully completing the school district's screening program for four year old children. Subjects for this study included 16 nonhandicapped children (10 boys and 6 girls) ranging in age from 45 months to 61 months (mean = 50.38, SD = 4.41) at the May 1985 (Time 1) testing, from 58 months to 74 months (mean = 63.38, SD = 4.41 athe the June 1986 (Time 2) teting, from 72 months to 88 months (mean = 77.50, SD = 4.60) at the August 1987 (Time 3) testing, and from 111 months to 122 months (mean = 115.69, SD = 3.52) at the November/December 1990 (Time 4) testing. Parental educational levels ranged from high school to post college with the majority of parents having a college education. The sample is best described as upper middle class.

Procedure

Each child was evaluated with the K=ABC by school psychologists trained in the administration of the K-ABC. Eight children who participated in the original testing (Time 1 and Time

2) moved from the area and did not participate in the Time 3 testing. An additional seven children could not be located for the Time 4 testing. The scores of these children on the global scales of the K-ABC (Time 1 and Time 2 testing) did not differ significantly from the scores of the 16 children in the present study.

Results

Mean scores on the K-ABC global scales, Mental Processing Composite (MPC), Sequential Processing (SEQ), Simultaneous Processing (SIM), and Achievement (ACH) were concentrated in the high average range at all four test times. Mean scores, standard deviations, and range are presented in Table 1

Insert Table 1 about here

Pearson product-moment correlations were computed for the K-ABC global scales and corrected for restriction in range(Guilford, 1954). This correction produced stability coefficients that ranged from .43 ($p < .05$) for MPC at Time 1/Time 2 to .90 ($p < .001$) for ACH at Time 3/Time 4. The complete table of correlations for K-ABC global scales is presented in Table 2

Insert Table 2 about here

Differences in mean global scale scores over time were analyzed by a repeated measures analysis of variance. Nonsignificant results were obtained for the global scale scores. Thus, all four scales remained quite constant over the five-year time interval.

To determine the extent to which the global scales differed from each other at each time of testing, a repeated measures analysis of variance was conducted for global scale scores at Time 1, Time 2, Time 3, and Time 4. Nonsignificant results were obtained at each testing time. Thus, the mean global scales did not differ significantly from each other at any of the four age levels.

Chi-square analyses of performance patterns (SIM > SEQ, SIM < SEQ, or SIM = SEQ) across the four test times were not significant. At each testing, a majority of the children did not show a preference for SIM or SEQ processing (67% at Times 1 and 4, 56% at Time 2, and 50% at Time 3), as shown by a significantly higher ($p < .05$) SIM or SEQ score (approximately 11 to 13 points depending on the age of the child). Similar analyses of MPC/ACH patterns across test times were not significant in that 50% of the children at Time 1, 75% of those at Time 2, and 56% of those at Times 3 and 4 showed nonsignificant differences between ACH and MPC scales.

To further analyze stability of individual SEQ-SIM differences, a "difference score" based on the SEQ-SIM differences for each child at each testing was created by a procedure described by A. Kaufman (personal communication, June 17, 1988). Each child's SEQ score was subtracted from his or her SIM standard score (retaining the sign of the discrepancy), and thus, a continuous variable was created. This procedure avoids the difficulties encountered by the chi-square procedure in which small changes in score (within the standard error of measurement) can alter the classification of the child as SIM or SEQ. The "difference scores" were correlated and produced correlations of .57 ($p < .01$) for Time 1/Time 2, .63 ($p < .01$) for Time1/Time 3, .41 ($p < .06$) for Time 1/Time 4, .62 ($p < .01$) for Time 2/Time 3, .62 ($p < .01$) for Time 2/Time 4, and .39 ($p < .07$) for Time 3/Time 4.

Discussion

A high level of stability between and among scores on the global scales of the K-ABC at ages 4, 5, 6, and 9 is indicated by the results of this study. All correlations were significant ($p < .05$) and ranged from .43 to .90 with an average correlation of .60 for the age 4/age 9 comparison. In fact, comparisons of Time 1 testing and Time 4 testing (a five year interval from age 4 to age 9) produced significant stability coefficients for all global scales. The repeated measures analysis of variance confirmed the observation that global scale scores were stable from age 4 to age 9. In addition, there were no significant differences among the mean global scales at each testing time (ages 4, 5, 6, and 9 years).

Of particular interest are the comparisons for ages 6 and 9 years, in which stability coefficients ranged from .55 (SEQ) to .90 (ACH). For this age range, the subtests administered are the same with the exception of Reading/Understanding on the Achievement Scale (added at age 7). Not only were the stability coefficients high but the global scale mean scores varied by an average of only 3.77 points (range of 6.50 for SEQ to 1.25 for SIM). For the school-age years of 6 to 9, the MPC and ACH scales demonstrated the highest level of stability closely followed by the SIM scale.

A final element of stability involves performance patterns such as SIM > SEQ or SIM = SEQ. In the current study, the percentage of children who exhibited these patterns was consistent at each level, and the majority of children displayed a SIM = SEQ pattern at each age level. Of greater importance, however, is the stability of a pattern for individual children. One child exhibited a SIM = SEQ pattern across the four test ages, one child demonstrated a SEQ > SIM pattern, and 14 children (88%) exhibited a variable pattern across the four test ages.

Since small changes (within the standard error of measurement) in SEQ or SIM score can alter the classification of the child as SIM or SEQ, "difference scores" were correlated and moderate correlations were obtained across the time intervals. These results, therefore, suggest that programming decisions based on processing style at early ages should be monitored on a regular basis especially in those cases in which the SIM-SEQ discrepancy is close to statistical significance (differences of 11 to 14 points). Use of a more rigorous standard, such as $p < .01$, for indicating a significant discrepancy should be considered. Employing that standard in the present study, for example, would have reduced the number of children with significant differences between SIM and SEQ at each age level by one-third. Stability of processing style is an important issue that demands further investigation with samples of different ages, disabilities, and socioeconomic background.

The current study suggests that the K-ABC is a stable measure of children's cognitive abilities from ages 4 to 9 years. Additional studies are needed to confirm these results as the current sample was homogenous and functioning in the high average range of ability. These characteristics, along with a sample size of 16, suggest caution in the interpretation of results.

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Table 1.

Means, Standard Deviations, and Minimum/Maximum Values for the K-ABC at Times 1, 2, 3, and 4 for 16 Nonhandicapped Students

Time 1 (Age 4)				
M	115.44	114.50	112.63	117.00
SD	10.51	9.74	11.76	11.92
Range	100-134	100-129	98-137	98-137
Time 2 (Age 5)				
M	119.00	115.19	117.56	114.44
SD	10.03	8.15	13.47	10.91
Range	105-140	100-131	100-147	92-132
Time 3 (Age 6)				
M	116.44	109.13	117.88	112.50
SD	10.82	14.08	10.86	11.07
Range	98-136	91-135	102-139	93-127
Time 4 (Age 9)				
M	120.63	115.63	119.13	115.63
SD	11.60	12.74	10.24	11.21
Range	97-146	91-139	101-139	93-132

Note. MPC = Mental Processing Composite; SEQ = Sequential Processing; SIM = Simultaneous Processing; ACH = Achievement Scale; Time 1 = May 1985; Time 2 = June 1986; Time 3 = August 1987; Time 4 = November/December 1990.

Table 2.

Correlations of K-ABC Global Scales at Ages 4, 5, 6, and 9

	Age 5	Age 6	Age 9
MPC at Age 4 (Time 1)	.30(.43)*	.45(.62)**	.45(.62)**
MPC at Age 5 (Time 2)		.65(.79)	.69(.83)***
MPC at Age 6 (Time 3)			.71(.89)***
SEQ at Age 4 (Time 1)	.35(.58)**	.53(.69)**	.32(.45)*
SEQ at Age 5 (Time 2)		.59(.81)***	.55(.78)***
SEQ at Age 6 (Time 3)			.50(.55)*
SIM at Age 4 (Time 1)	.46(.55)*	.53(.65)**	.55(.71)***
SIM at Age 5 (Time 2)		.72(.82)***	.74(.85)***
SIM at Age 6 (Time 3)			.73(.85)***
ACH at Age 4 (Time 1)	.82(.89)***	.67(.77)***	.51(.63)**
ACH at Age 5 (Time 2)		.85(.88)***	.62(.74)***
ACH at Age 6 (Time 3)			.84(.90)***

Note. Correlations in parentheses are corrected for restriction in range. This table presents correlations of test scores of K-ABC Global Scales at ages 4, 5, and 6 with test results obtained at ages 5, 6, and 9 for the same 16 children. For example, the MPC correlation of age 4 testing with age 5 testing was .43, and the MPC correlation of age 4 testing with age 9 testing was .89.

$^{*}p < .05$ $^{**}p < .01$ $^{***}p < .001$