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The Relation Between Adaptive Behavior and Intelligence: Testing Alternative Explanations

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Adaptive behavior has become an increasingly important component of the assessment of children referred for learning and behavioral problems in educational settings. Yet the construct of adaptive behavior remains ill defined, and fundamental questions about the nature of adaptive behavior remain unanswered. As a result, measures of adaptive behavior are often problematic. Among the most important of these fundamental questions is the nature of the underlying relation between adaptive behavior and intelligence. The present study used confirmatory factor analysis and 556 school-age children from the overlap of the standardization sample of the Vineland Adaptive Behavior Scale and the Kaufman Assessment Battery for Children to test three models of the relation between adaptive behavior and intelligence: as identical underlying constructs, as completely unrelated constructs, or as separate but related constructs. The model specifying adaptive behavior and intelligence as separate but related constructs proved significantly better than either competing model. Similar results were obtained for preschool children and low-ability school-age children, further suggesting that adaptive behavior and intelligence should be considered as separate but related constructs. Two plausible models to further explain the nature of this relation are presented.

Adaptive behavior instruments have become an important component of the assessment of exceptional children in educational settings (Mercer, 1979; Reschly, 1982). While intelligence measures have long been used in making educational placement decisions, adaptive behavior measures, which assess an individual's performance of daily activities required for personal and social sufficiency, have only recently gained increased acceptance. A number of factors appear to have contributed to this growing acceptance, including recent court cases and legislation addressing the fairness of special education placements (e.g., *Larry P. v. Riles*, 1979), concern with nonbiased assessment (Oakland, 1977), changes in federal laws (e.g., PL 94-142), and changes in how mental retardation is defined (cf. Heber, 1959 with Grossman, 1983). Additionally, recent research (Keith, Harrison, & Ehly, in press) has suggested that adaptive behavior has an important effect on academic achievement, thus further supporting its usefulness in educational settings. Clearly, then, considerable support exists for consid-

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ering adaptive behavior findings in making educational decisions concerning exceptional children.

However, as adaptive behavior assessment has become more prominent, its current inadequacies have also become more apparent. Many educators have found adaptive behavior assessment to be irrelevant, time-consuming, unreliable, and impractical (Baumeister & Muma, 1975; Nagler, 1972). Adaptive behavior assessment has been cited as providing information of only limited utility in schools (Zigler, Balla, & Hodapp, 1984), and the validity of many adaptive behavior measures remains debatable (Witt & Martens, 1984).

Such problems with adaptive behavior assessment may reflect uncertainties about the *construct* itself. In essence, there are a number of fundamental, yet unanswered, questions concerning the very nature of adaptive behavior, thus establishing a need to better understand its theoretical underpinnings. Among the most salient of these questions would seem to be the relation between adaptive behavior and intelligence, a relation that is not yet well defined. On one hand, some type of relation between adaptive behavior and intelligence seems obvious, given the similarities in their definitions and in their presumed causes and apparent effects. Both constructs have been described as the ability to cope with one's environment (Nihira, Foster, Shellhaas, & Leland, 1974; Wechsler, 1974). Adaptive behavior has been described as a function of both development and cultural expectations (Witt & Martens, 1984); intelligence has also been theorized to be a function of both development and cultural demands (Stoddard, 1943), along with other environmental influences and heredity (Cattell, 1982; Vernon, 1979).

It might seem, then, that these two constructs are quite similar in their definitions and in their presumed causes. Such similarity is supported by correlations between measures of adaptive behavior and intelligence; most are in the moderate (.4–.6) range (Kicklighter, Bailey, & Richmond, 1980; Lambert, 1978; Leland, Shellhaus, Nihira, & Foster, 1967).

On the other hand, there are obvious distinctions between adaptive behavior and intelligence, and it would seem a mistake simply to assume that adaptive behavior and intelligence are different aspects of the same general construct. If they are, why do some children display adequate adaptive behavior but low intelligence or vice versa? The features that distinguish adaptive behavior and intelligence include the following: (1) Adaptive behavior emphasizes everyday behavior, whereas intelligence emphasizes thought processes; (2) adaptive behavior focuses on common or typical behavior, whereas intelligence focuses on maximum performance; and (3) adaptive behavior stresses nonabstract, nonacademic aspects of life, whereas intelligence stresses those aspects that are abstract and academic (Meyers, Nihira, & Zetlin, 1979, pp. 433–434).

Finally, the possibility remains that adaptive behavior and intelligence are two separate constructs, independent of each other. In fact, several researchers claim that adaptive behavior and intelligence are not related, arguing that viewing the two constructs in this light is a misconception (Mercer, 1979, p. 109; Coulter, 1980).

Research has provided little help in determining the nature of the relation between adaptive behavior and intelligence. A great deal of variability in correlations between intelligence and adaptive behavior has been reported, depending, in part, on the specific measures used (Reschly, 1982). In fact, some observers have noted that there seem to be as many different relations between adaptive behavior and intelligence as there are measures of adaptive behavior (Witt & Martens, 1984), and thus support can be found for virtually any position! For example, correlations between the American Association on Mental Deficiency (AAMD) Adaptive Behavior Scale (ABS) and intelligence have been reported as high as .77 (Roszkowski & Bean, 1980). Correlations of this magnitude could certainly support the position that adaptive behavior and intelligence are simply differing aspects of the same general construct (within the confines of measurement error). On the other hand, correlations between the Adaptive Behavior Inventory for Children (ABIC) and intelligence range from .09 to .47 (Harrison, 1981; Mercer, 1979; Oakland, 1979, 1983); the correlations at the lower end of this range (e.g., Mercer, 1979, p. 124) could similarly be used to support a theory of adaptive behavior and intelligence as separate, unrelated constructs.

Some of this variability can be accounted for by the adaptive behavior measure (and the intelligence measure) employed; the measures that are strong in the assessment of cognitive development tend to show higher correlations than those focusing on self-help skills and socialization. One would expect, for example, the cognitively oriented Children's Adaptive Behavior Scale (CABS) to correlate more strongly with intelligence than the ABIC, which eschews most cognitive skills. In addition, the differences in correlations may be related to the handicaps of the subjects used in the studies. There appears to be a trend toward higher correlations as the handicaps of the subjects become more severe (note, for example, the changes in correlations in Sparrow, Balla, & Cicchetti, 1984, pp. 48-52).

Obviously, there is no clear consensus as to the relation between adaptive behavior and intelligence. Yet there is an obvious need to determine the underlying nature of this relation because it has implications for the meaning of both intelligence and adaptive behavior (Reschly, 1982). Furthermore, both constructs may be important components of children's overall development and, more specifically, of their educational programming. How they fit together in that development has yet to be determined. As Reschly (1982) has pointed out, we do not yet know if adaptive behavior and intelligence are best considered as two separate but related constructs, as two unrelated constructs, or as different aspects of the same construct (pp. 231-232). The purpose of this study was better to determine the nature of the relation between intelligence and adaptive behavior. To fulfill this purpose, we used confirmatory factor analysis and a contemporary national sample to test several alternative models of the relation between the two constructs.

METHOD

Subjects

The subjects for this study were 556 children in grades 1-8 (aged 5-12) who participated in the standardization of both the Vineland Adaptive Behavior Scales Interview Edition, Survey Form (Vineland) (Sparrow et al., 1984), and the Kaufman Assessment Battery for Children (K-ABC) (Kaufman & Kaufman, 1983). This set of students was used because it provided a large, national sample of children for whom both intellectual ability and adaptive behavior information was available. The standardization was conducted in 34 cities in 24 states, and the subjects were stratified on the basis of 1980 census estimates according to age, ethnicity, socioeconomic status, community size, and region of the country. The overlap between the two standardization samples was also quite representative and was consistent with both larger samples. Of particular interest is the diversity of the standardization sample overlap, which included all levels of ability; standard scores on the K-ABC Mental Processing Composite ($M = 100$, $SD = 15$) ranged from 47 to 153.

Instrumentation

All subjects had been administered both the K-ABC and the Vineland as a part of both instruments' standarization. As documented elsewhere both instruments are well standardized, and there is evidence to support their reliability and validity for a variety of purposes (Kaufman & Kaufman, 1983; Sparrow et al., 1984). Test scores on the Vineland and K-ABC were used to create the following variables for use in the present analyses.

Ability. The Mental Processing Composite from the K-ABC can be used as a measure of intellectual ability. However, some researchers (e.g., Jensen, 1984; Keith, 1985; Keith & Dunbar, 1984) have suggested that the K-ABC *achievement* subtests may measure verbal ability and general intelligence as much as, or more than, they measure achievement. Specifically, a Verbal Reasoning factor derived from the K-ABC Faces and Places, Riddles, and Arithmetic subtests was virtually identical to a second-order or *g* factor (Keith & Dunbar, 1984). Given this evidence, and the ample support for viewing the K-ABC Sequential and Simultaneous Processing scores as measures of intellectual ability (Keith, 1985; Kaufman & Kaufman, 1983), three indexes of intellectual ability were used in the present study: the K-ABC Sequential Processing standard score (called Verbal Memory by Keith & Dunbar, 1984), the K-ABC Simultaneous Processing standard score (Nonverbal Reasoning), and a Verbal Reasoning composite formed by averaging standard scores on the K-ABC Faces and Places, Riddles, and Arithmetic subtests. Again, the rationale for this three-index categorization is based on previous research suggesting that these three verbal tests may provide strong measures of intellectual ability (e.g., Keith & Dunbar, 1984). The remaining K-ABC achievement tests (Reading Decoding and Reading Understanding) seem to represent a different dimension, namely reading *achievement* (Keith, Hood, Eberhart, & Pottebaum, 1985). Of course, the interpretation of such results is still being debated (cf. Kaufman, 1984; Kaufman & McLean, in press; Keith, 1986; Keith & Dunbar, 1984).[1]

Adaptive Behavior. Adaptive behavior was measured by means of three domain standard scores from the Vineland, namely, those of the Socialization, Daily Living Skills, and Communication domains. These domains have been identified as separate dimensions but with enough overlap to justify their being combined into the Vineland's Adaptive Behavior Composite (Sparrow et al., 1984, pp. 40, 46). Thus, there is preliminary support for a second-order adaptive behavior "factor," with the first-order factors being similar in structure to the Socialization, Daily Living Skills, and Com-

[1]As one reviewer correctly noted, using subtest composites as the first step in the analyses assumes that the composites adequately reflect the structure (or first-order factors) of the tests. We believe that such an assumption, based on the research cited under Instrumentation, is warranted for both the Vineland and the K-ABC. Furthermore, even fairly substantial deviations in factor structure would likely have only small effects on the magnitude of the relation between the second-order factors (adaptive behavior and ability).

munication domains of the Vineland. The Vineland Motor domain, administered to children under 6, was not included in these analyses.

Analysis

Confirmatory factor analysis (LISREL) (Jöreskog & Sörbom, 1984) was used to evaluate three hypotheses concerning how adaptive behavior and intelligence are related. In confirmatory factor analysis, the number and composition of factors (called a model) are specified in advance, and the researcher's hypotheses are supported or questioned by how well the model fits the data. In essence, the model is the researcher's theory and this theory is tested against the data.

The basic model to be analyzed in the study is shown in Figure 1, a simple factor model in which an adaptive behavior factor is assumed to underlie the Daily Living Skills, Communication, and Socialization scales of the Vineland. Similarly, a general intellectual ability factor is presumed to explain the Verbal Reasoning, Nonverbal Reasoning, and Verbal Memory composites from the K-ABC. The paths in the model make explicit the assumption that the latent factors explain or "cause" the observed scores. The curved line (labeled ϕ or phi) represents the correlation between the factors, and it is this value that is manipulated in the three primary analyses. In the first analysis, phi is left free to vary, a model that corresponds to the notion that adaptive behavior and intellectual ability are separate but related constructs. In the second analysis, phi is constrained to zero, reflecting the theory that adaptive behavior and intellectual ability are *unrelated* constructs. The results of this second analysis are then compared to those of the first analysis to see which better "fits" the data. For the third analysis, phi is constrained to 1.0, in which case the model then reflects the notion that adaptive behavior and intellectual ability are the *same* construct.

Readers unfamiliar with confirmatory factor analysis, path analysis, or analysis of covariance structures may question why such analyses should provide a better test of the relation between adaptive behavior and intelligence than simply correlating a test of adaptive behavior with a test of intelligence. In essence, it is because such techniques test the relation between the underlying *constructs* rather than the relation between the measures of those constructs. Although our interest in psychology and education is often with hypothetical constructs—such as intelligence or adaptive behavior—we can only measure those constructs imperfectly, and with an unknown amount of error. It is possible, however, to use our measures to estimate the underlying constructs, and by using several measures to create "unmeasured variables" (or factors) to more closely approximate those constructs. And when the relations among such unmeasured variables are then studied, a "purer" (less error-filled), less scale-specific estimate can be made of those relations. As a result, users of such techniques often talk of relations among "true" variables. Here, for example, we examine the relation between "true" (or unmeasured, or latent) intellecutal ability and "true" adaptive behavior. Although the Vineland and K-ABC may not provide measures of "true" adaptive behavior or intellectual ability, if they provide adequate, multiple measures, then the unmeasured factors come close to estimating the "true" constructs, and even closer to estimating the "true" relation between the constructs. Thus, the focus of the present research is not with the K-ABC or the Vineland, but rather with the constructs these scales measure: ability and adaptive behavior. An additional advantage of the LISREL approach over

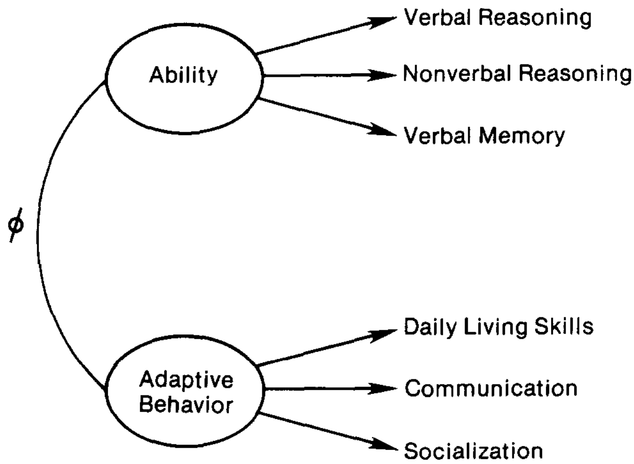

Figure 1. Confirmatory factor model of the relation between adaptive behavior and ability.

other possible approaches to studying latent variables is that several theoretical models can be tested against each other.[2]

THREE MODELS OF ABILITY AND ADAPTIVE BEHAVIOR

The intercorrelation matrix of the variables used in these analyses is shown in Table 1. The initial model to explain the relation between adaptive behavior and intelligence—a model that assumes that adaptive behavior and intelligence are separate, but related constructs (Model 1)—is shown in Figure 2. A cursory inspection of the model shows strong, significant loadings for the six subscales on the corresponding adaptive behavior and intellectual ability factors, thus offering support for hypothesized factor structures. For the intellectual ability factor, Verbal Reasoning had the highest loading (.87); Nonverbal Reasoning had a somewhat lower loading (.74) and Verbal Memory a still lower loading (.63) (cf. Keith & Dunbar, 1984). Socialization and Daily Living Skills had the highest loadings on the adaptive behavior factor (.75 and .72, respectively), with a slightly lower loading (.70) for the Communication domain. Finally, the correlation between the two factors, or between "true" ability and "true" adaptive behavior, was .39, a moderate, but significant ($t > 2.0$), correlation.

The "goodness-of-fit" statistics, listed below the model in Figure 2, suggest that the model proposed provides a generally good fit to the data.[3] The adjusted "goodness-of-

[2]This is a highly simplified explanation of several complex topics. For a good introduction to the notions of latent variables, path analysis, and analysis of covariance structures, readers can consult Kerlinger (1986). For more depth, see Bentler (1980), Dwyer (1983), Jöreskog and Sörbom (1979), or Kenny (1979). The method of comparing competing models that is used here is discussed in Bentler (1980) and in Kerlinger (1986). We do not wish to overstate the advantages of LISREL or similar techniques; such methods, while powerful, are not without their drawbacks, especially their complexity, interpretability, and difficulty of use (Kerlinger, 1986).

[3]The "goodness-of-fit" statistics provide a measure of how well the data fit the proposed model. If the chi-square value is large compared to the degrees of freedom, the null hypothesis that the

Table 1
Variable Intercorrelations

Variable	1	2	3	4	5	6
1. Verbal Reasoning	1.00					
2. Nonverbal Reasoning	.65	1.00				
3. Verbal Memory	.54	.47	1.00			
4. Daily Living Skills	.15	.11	.17	1.00		
5. Communication	.43	.29	.36	.49	1.00	
6. Socialization	.18	.16	.17	.58	.50	1.00

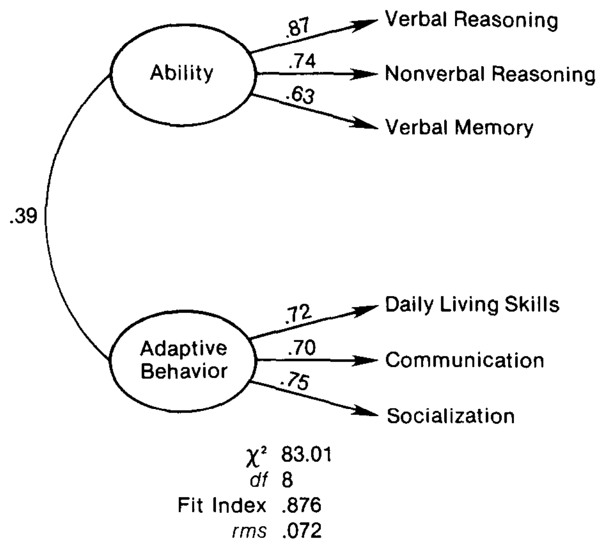

Figure 2. Model 1: Adaptive behavior and ability are assumed to be separate but related constructs. The correlation between the factors estimates the degree of the relation between "true" ability and "true" adaptive behavior.

model fits the data is rejected. An associated probability can also be computed, but it is dependent on sample size, with even good models being rejected with large samples such as that used here. Therefore, a "goodness-of-fit" index is calculated that increases as the model better fits the data; this adjusted goodness-of-fit index ranges from 0 to 1, a value of 1 indicating a perfect fit. Finally, the fit of the model can be assessed by comparing the *original* correlation matrix with the correlations *predicted* by the model; the average of these differences is the root-mean-square residual correlation (*rms*). An *rms* below about .10 is generally considered suggestive of a good fit. For more information, see Jöreskog and Sörbom (1984).

fit" index for Model 1 was .876; the root-mean-square residual correlation (*rms*) was .072, indicating that the correlation matrix predicted by this model differed from the original correlation matrix, on the average, by only .072.

The factor loadings and fit statistics for Model 2 are shown in Table 2, the only difference between this model and that show in Figure 2 being that the correlation between adaptive behavior and ability is here constrained to zero (the statistics for Model 1 are also shown in the last column of Table 2 to aid comparisons). In other words, Model 2 specifies that adaptive behavior and intellectual ability are *unrelated* constructs. The factor loadings for this model are quite similar to those shown in Model 1, and all are significant. However, the fit for Model 1 is considerably better than that for Model 2. For Model 2, the adjusted goodness-of-fit index reduced to .843, whereas the root-mean-square residual correlation increased to .160. Chi-square also increased, from 83.01 in Model 1 to 134.36 in Model 2, with one added degree of freedom. Indeed, this change in χ^2 (51.35 at *df* = 1) is significant, suggesting (as did the significant correlation between adaptive behavior and intellectual ability in Model 1) that Model 1 provides a significantly better fit to the data than does Model 2. Thus, the model that posits that adaptive behavior and intellectual ability are separate but related constructs is superior to the model that holds that the two constructs are unrelated.

Table 2 also displays the results for Model 3, in which the correlation between adaptive behavior and intellectual ability was constrained to 1.0.[4] There are shifts in the factor loadings in this model (which specifies that adaptive behavior and intellectual

Table 2
Factor Loadings (Paths), Constrained Factor Correlations, and Fit Statistics for Models 2 and 3

Paths, correlations, and fit	Model 2	Model 3	Model 1
Ability to:			
Verbal Reasoning	.87	.83	.87
Nonverbal Reasoning	.75	.72	.74
Verbal Memory	.62	.64	.63
Adaptive Behavior to:			
Daily Living Skills	.75	.30	.72
Communication	.65	.55	.70
Socialization	.77	.33	.75
Ability with Adaptive Behavior[a]	0	1.0	.39
Fit statistics			
Chi-square	134.36	379.91	83.01
df	9	9	8
Adjusted fit index	.843	.521	.876
rms	.160	.153	.072

Note: Statistics for Model 1 are included for comparison.
[a]This value is fixed at 0 in Model 2, at 1.0 in Model 3.

[4]Model 3 is equivalent to a model in which one general factor is presumed to underlie all ability and adaptive behavior measures, and the results of an analysis of such a one-factor model would be identical to those reported here.

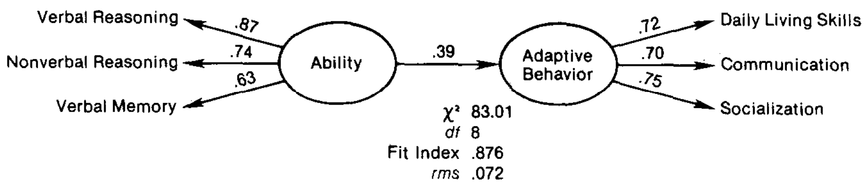

Figure 3. A simple causal model: The influence of intellectual ability on adaptive behavior.

ability are the *same* construct), both factors reflecting a more verbal content. There are also significant changes in the statistics for this model compared to Model 1; the adjusted goodness-of-fit index reduced to .521 and the average residual correlation increased to .153. Furthermore, the increase in chi-square from Model 1 to Model 3 is highly significant (chi-square = 296.90 at *df* = 1), indicating the superiority of Model 1 over Model 3. Again, the separate-but-related construct model appears to be significantly better than the model specifying adaptive behavior and intellectual ability as identical constructs.

TWO ADDITIONAL PLAUSIBLE MODELS

These results go far in explaining the underlying nature of the relation between adaptive behavior and intellectual ability. The results suggest that adaptive behavior and intelligence are related but separate constructs rather than unrelated or identical constructs. Unfortunately, the analyses do not reveal the true nature of the correlation. Is, for example, the correlation due to some sort of causal relation between intellectual ability and adaptive behavior (Keith et al., in press)? Or is the correlation between adaptive behavior and intellectual ability the product of some other variable, such as general development (Lambert, 1978, p. 168), that "causes" both adaptive behavior and ability? Two plausible models testing these possibilities are shown in Figures 3 and 4.

Figure 3 shows a simple causal model in which intellectual ability affects adaptive behavior. In essence, this model simply assumes that the correlation between the variables is causal, and the path of .39 from intellectual ability to adaptive behavior suggests that for each standard deviation increase in intellectual ability, adaptive behavior should increase by .39 of a standard deviation. Figure 4 shows a hierarchical factor model in which it is assumed that intelligence and adaptive behavior are not *causally* related but are rather the product of some other, unmeasured variable, here named general development. This model suggests that general development influences both ability (path = .66) and adaptive behavior (path = .59).

Unfortunately, the models in Figures 3 and 4 must remain plausible, but competing, models. As can be seen in Figures 3 and 4, the factor loadings and fit statistics for the two models are virtually identical, and both are almost identical to the results of the model shown in Figure 2. In other words, the three models are statistically indistinguishable; we cannot, at least with the present data, further determine the true nature of the relation between adaptive behavior and intelligence. While the two constructs *are* related, longitudinal data will be required to determine which of the two models shown

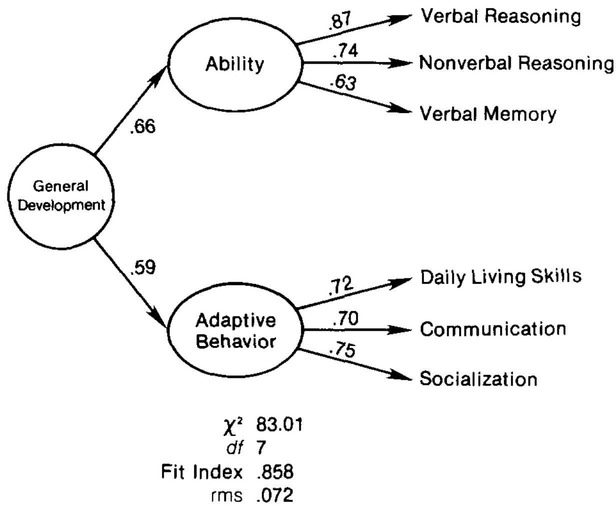

Figure 4. A hierarchical factor model to explain the relation between adaptive behavior and ability.

here is the better explanation of this relation. Finally, a third possibility exists: that the relation between adaptive behavior and intelligence is spurious. That is, that both adaptive behavior and intelligence are the product of some other set of unmeasured common causes (or "third" variables, discussed in detail by Simon, 1954) other than general development. Again, additional analyses, especially those involving longitudinal data, will help to explicate further the relation between adaptive behavior and intelligence.

CONCLUSIONS

The purpose of this research was to compare three hypothesized models of the nature of the relation between adaptive behavior and intellectual ability, the three models being designed to determine whether adaptive behavior and ability are separate but related constructs, completely independent constructs, or different facets of the same construct. The results of these analyses suggest the clear superiority of the model specifying separate but related constructs over the other two models. Thus, these results suggest that adaptive behavior and intellectual ability should be considered as separate, but related, constructs.

Although not the purpose of this research, the factor loadings and fit statistics for Model 1 also support the composition of the adaptive behavior and intellectual ability factor model. That is, these analyses support the validity of the three Vineland domains as measures of adaptive behavior and the three K-ABC composites as measures of intelligence. Thus, an equally weighted composite of Daily Living Skills, Socialization, and Communication would seem to provide a good measure of adaptive behavior. These results, which are consistent with previous findings (e.g., Keith & Dunbar, 1984), also suggest that the Verbal Reasoning Composite used here is an important component of intellectual ability, followed in importance by the Nonverbal Reasoning (Simultaneous) and Verbal Memory (Sequential) composites.

Although the research reported here is primarily theoretical in orientation, it also has practical implications. The small to moderate correlation found between adaptive behavior and ability suggests that the inclusion of both measures in an assessment is not redundant, but rather really *does* provide for a multifactored assessment. When assessing a low-achieving child for possible placement in a program for the mentally retarded, for example, a school psychologist might reasonably expect "significantly subaverage intelligence" to be accompanied by "deficits in adaptive behavior" (Grossman, 1983, p. 11), because the two constructs apparently are significantly related. However, the correlation is also not large, and thus the two types of measures will not always be consistent; intelligence that is significantly below average will not assure below-average adaptive behavior (or vice versa).

The possibility still remains, however, that the relation between intellectual ability and adaptive behavior changes with different ages or ability levels. For example, it seems reasonable to assume that ability and adaptive behavior should be more closely related in younger or otherwise less mature children (Coulter & Morrow, 1978). To test this possibility, we analyzed the models shown here for the preschoolers from the overlap of the Vineland and K-ABC standardization samples (i.e., ages 2 1/2 through 4 years, $N = 194$). The results of these analyses were quite similar to those reported above; for preschoolers as well as school-age children, a theoretical model specifying adaptive behavior and ability to be related but separate constructs was significantly better than models hypothesizing adaptive behavior and ability to be unrelated or identical constructs. Furthermore, the correlation between "true" ability and "true" adaptive behavior was quite similar to the value for school-age children: .38.

The three models were also tested for low-ability school-age children. The subjects in the Vineland/K-ABC standarization overlap were also administered the Peabody Picture Vocabulary Test–Revised (PPVT-R); we also analyzed Vineland and K-ABC data for 95 school-age subjects who scored 85 (− 1 *SD*) or lower on the PPVT-R. Even with the resulting restriction in range, the correlation between "true" ability and "true" adaptive behavior was .31, and the model specifying separate but related constructs provided a better fit to the data than did the competing models.[5]

It appears, then, that "true" adaptive behavior and "true" ability (that is, the latent factors, or *constructs*) are correlated. Furthermore, two plausible models to explain the nature of this correlation have been presented. Yet further research, especially that involving longitudinal analyses, will be required to determine whether adaptive behavior and intelligence are causally related, or whether the correlation between the constructs is the result of general development or some other set of common causes. In addition, similar analyses involving other measures of the same constructs, and involving other samples (including handicapped) will also be needed to understand and further clarify the nature of the relation between adaptive behavior and intellectual ability.

[5]For low-ability children, the difference in chi-square between Model 1 (separate, but related) and Model 2 (unrelated) was insignificant. However, all other fit statistics suggest the superiority of the separate but related model over the unrelated construct model for low-ability youth. The difference between the chi-squares for Model 1 and Model 3 was significant.

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