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ABSTRACT

A model of self concept in children was examined by conducting a construct validation of a self concept instrument, the Self-Appraisal Inventory (SAI). The SAI was an 80-item instrument with four subscales: General, Family, Peer and Scholastic, all of which were based on behavioral objectives. The model was made more useful for a school setting after additional testing. What emerged was a 65-item instrument with six subscales: positive relationships with family; positive relationships with peers; school--academic competence; denial of negative feelings; agreement with positive statements regarding self; and school--enjoyment of classroom situation. (Author/MV)

Self-Concept in a School Setting: Construct Validation by Factor Analysis

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INTRODUCTION

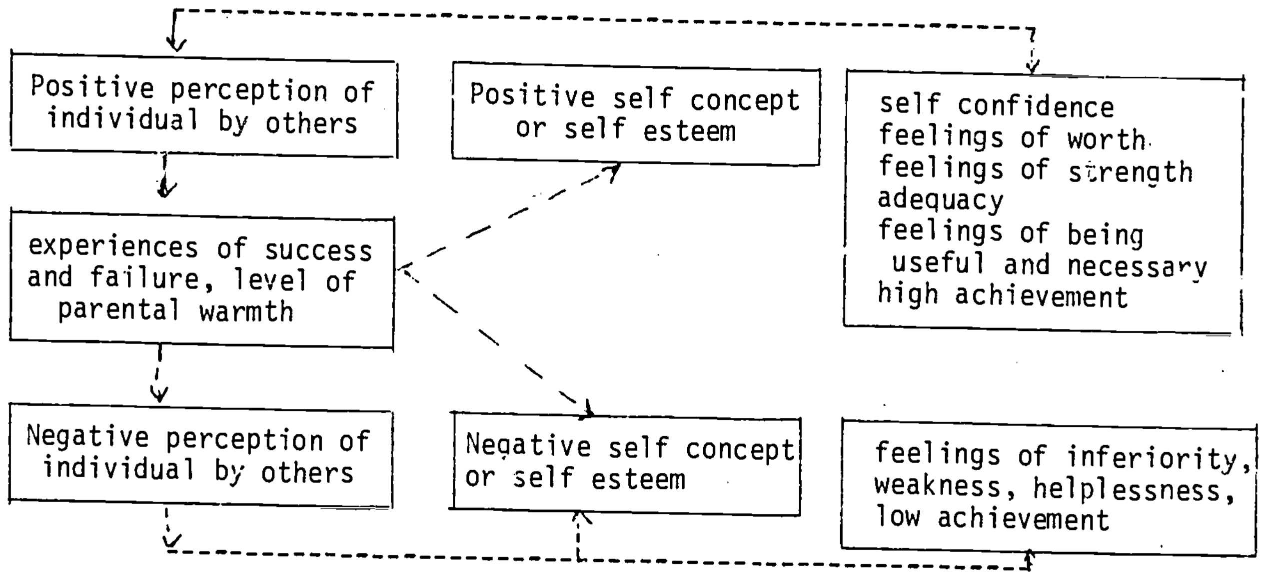
Poets have told us for centuries that our views of ourselves determined our actions. From Narcissus to the Emperor Jones, from The Clouds to The River Niger, heroes of literature have had their triumphs and their tragic flaws determined by self-perception.

Also, the perception of one's own self held by the individual student has long been regarded informally by educators as a source of motivation in an academic setting, and this belief is supported by research in the areas of perception and psychotherapy. Thus, the development of self-esteem, or a positive self concept, is widely held as an objective of public schools, both for its own value and for the enhancement of achievement in academic areas (Brookover, et al., 1964; Combs, 1962; Campbell, 1968).

Self concept is viewed here as a motivational construct that guides and determines behavior. Various theorists (Mead, 1934, Rogers, 1954, Snygg and Combs, 1949, Maslow, 1954, 1970, Coopersmith, 1959) have postulated sets of behaviors associated with positive self concept, or self esteem, and negative self concept, or low self esteem. These behaviors are summarized in the schematic sketch below:

Figure 1

The Self Concept Construct



(Solid lines indicate time sequence
Dotted lines indicate the continual feedback and cycling of the system)

The study presented in this paper is a construct validation of a self concept instrument. It compares a logically postulated structure of the instrument with the structure determined by the factor analytic procedures. It then examines possible extensions of the model, and their implications for item selection and scoring.

A number of instruments have been used for self concept measurement in a school setting (Coopersmith, 1960; Piers and Harris, 1964; Brookover, et al., 1964; Ketcham and Morse, 1969). Some have reported single scores, and others have reported subscale scores.

These instruments have their basis in the work of Jersild (1952) who investigated the categories used by different age levels of children in describing themselves. He reported that categories of self-description prominent at one level are also prominent at other levels, and concluded that there was a "universal language of self".

Validity studies of these instruments have involved criterion related validation or construct validation. The external criteria are usually some measure of antecedents or consequents shown in the diagram, or scores on some other self concept instruments. Construct validation has involved multi-trait multi-method analysis, or factor analysis.

The primary criterion of self concept explored in the literature is logically school achievement. Bobsun (1973) gives an extensive bibliography of studies of this type. Generally, low to moderate positive relationship is found between self concept and academic success. Purkey (1970) and Sharma (1971) review many of these studies. Wylie's (1960) extensive review was critical of validation studies done at that point. She stressed the need for development of assessment procedures that explore the internal structures of the instruments, and suggested factor analysis as an appropriate technique for this purpose.

Construct validation involves an investigation to determine what psychological qualities account for performance on a test. In the words of Cronbach and Meehl, "Construct validation takes place when an investigator believes that his instrument reflects a particular construct, to which are attached certain meanings. The proposed interpretation generates testable hypotheses, which are a means of confirming or disconfirming the claim" (Cronbach and Meehl, 1955, p. 290).

The multi-trait multi-method approach may be a very thorough one, but mixed results such as those of Dyer (1963) suggest that this technique should be preceded by a careful definition of the subconstruct structure around which the validation network is to be built. Factor analysis provides a method for defining this structure.

In the construct validation studies employing factor analysis, the content of the cluster of items comprising each factor is examined for its psychological meaningfulness as a factor, and its relation to the construct itself.

The process of validation by factor analysis can be outlined as follows: Consider any measure, an entire test or a test item. The total variance of that measure is composed of three types of variance; common, unique and error (Guilford and Fruchter, 1973; Kerlinger, 1972).

$$\sigma^2_X = \underbrace{\sigma^2_a + \sigma^2_b + \ldots + \sigma^2_r}_{\text{variance of common factors}} + \underbrace{\sigma^2_s}_{\text{specific variance}} + \underbrace{\sigma^2_e}_{\text{error variance}}$$

then,

$$1 = \frac{\sigma^2_a}{\sigma^2_x} + \frac{\sigma^2_b}{\sigma^2_x} + \ldots + \frac{\sigma^2_r}{\sigma^2_x} + \frac{\sigma^2_s}{\sigma^2_x} + \frac{\sigma^2_c}{\sigma^2_x}$$

Validity is defined as the ratio of common factor variance to total variance. Communality is also defined in the same manner. Then validity = communality = all non-error variance except the specific variance. Much of the Guilford work using this validity = communality definition involves ability tests. In this study, the definition of validity will be limited to that part of the communality which is interpretable psychologically. Repeating the above equation with the definitions attached,

$$1 = \underbrace{\frac{\sigma_a^2}{\sigma_x^2} + \frac{\sigma_b^2}{\sigma_x^2} + \ldots \frac{\sigma_r^2}{\sigma_x^2}}_{\text{communality=validity}} + \underbrace{\frac{\sigma_s^2}{\sigma_x^2}}_{\text{specific var.}} + \underbrace{\frac{\sigma_e^2}{\sigma_x^2}}_{\text{error var.}}$$

In this development, both Guilford and Fruchter, and Kerlinger are generally referring to a measure as a test, rather than an item. They can then interpret the ratio $\sigma_a^2 / \sigma^2 x$ as a validity coefficient for the test x with respect to factor a. A sampling from the universe of psychological tests could be made, and if a test x had a high loading on factor a, this would be interpreted as validating test x for the factor a. In this paper, the measure x is a test item. Thus, the ratio $\sigma^2 a/\sigma^2 x$ is an index of the proportion of item variance attributable to factor a. Rather than factoring a sample from the universe of psychological tests, we are factoring a sample from the universe of items postulated to represent four dimensions of self-concept.

It is recognized that whatever factor pattern is identified in a self concept instrument is a strong function of the culture. This does not detract from the value of the study. It is true that the factor pattern, in order to have utility, ought to be reasonably invariant, for some solutions, in different populations. Or, if variant, the differences should be related to known differences between populations. Since factor analysis is a correlation technique, the factor pattern is dependent on the variance of the variables being factored, as well as their covariances. Restriction of range on a variable within a particular population affects the correlation of that variable with another. Likewise, the total sample space, or the amount of variance on all of the variables (items) being factored affects the factor loadings and factor pattern.

A description of factor pattern is then, a conditional statement. Given characteristics of a population 1...n, the instrument, and the characteristic being measured, has this pattern of factors.

Piers and Harris (1964) developed an 90 item inventory based on Jersild's descriptive work. Their factor analysis identified six factors accounting for 40% of the variance: Behavior, General and Academic Status, Physical Appearance and Attributes, Anxiety, Popularity, and Happiness.

Butler and Haigh (1954) developed 100 self referent items for use with adults, to determine the degree of change in psychotherapy. These items were revised by Coopersmith (1959) for use with children. The Self Esteem Inventory (SEI) that Coopersmith developed is a short instrument with four subscales: social self, self esteem, school self, and family self. There is extensive validation of this instrument with external criteria, and by factor analysis (Coopersmith, 1967, Lundis, 1972, Pennsylvania Department of Education, 1971, Kotz and Zigler, 1964).

Certainly the selection of items is at least a delimiter of the types of factors that can be extracted. Since the self is a complex construct, it is not surprising that different instruments have often exhibited different factor structures. There is a range of content in factors extracted, but all have a strong general self-evaluation factor of some type. Most of the studies support the existence of approximately four sub-areas of self concept or self perception, related to home, school, family, and a broad general area, (Cyrier, 1973, Harrison and Budoff, 1972, Stanwyck and Felker, 1971).

This study evaluated a four factor model of self concept in children by conducting a construct validation of a self concept instrument, the Self-Appraisal Inventory that was constructed to have four subscales. The following questions were explored as aspects of the problem:

1. The basic construct validation question: How does the factor pattern of the instrument correspond to the logically-based pattern?
2. Model modification: What changes in the postulated model are indicated?

II. Method

A. Description of Samples

The samples were originally drawn for a statewide assessment conducted by the Department of Public Instruction of the State of Iowa in the 1970-71 School Year. The universes consisted of all full-time students in grade four and in grade seven in the public schools in Iowa.

A stratified, multistage, cluster sample of students was selected from each population. Three zones were designated: urban, suburban, and the remaining parts of the state.

B. The Instrument

The Self-Appraisal Inventory (SAI) (Appendix A) was developed by the Instructional Objectives Exchange (IOX) in response to requests from several state ESEA Title III representatives for the development of objectives and measures which could be used in educational needs assessment. The Instructional Objectives Exchange is a non-profit corporation, established in 1968 by the UCLA Center for the Study of Evaluation to serve as a clearinghouse for the exchange of instructional objectives by schools, to collect and develop measuring techniques appropriate for assessing these objectives, and to develop objectives in areas where none currently exist. Funds were appropriated by the various states from their Title III grants for the development of a set of instruments to measure objectives relating to a variety of affective variables at grade levels from primary through senior high school. The SAI was one of this group of instruments.

The SAI builds on a body of research and instrumentation related to the assessment of self-concept in a school setting. It has a large overlap of items from both the Piers-Harris and the SEI inventories.

The Self-Appraisal Inventory (SAI) is an 80 item self-concept instrument with four logically determined subscales developed on the basis of behavioral objectives related to four dimensions: (1) General, (2) Family, (3) Peer, (4) Scholastic (IOX, 1970). These objectives appear under examination to be operational definitions of self concept in four postulated dimensions. In this regard it does not differ significantly in conceptual base from any of a vast number of psychological tests and scales designed to measure one or another construct. Item selection was based on four hypothesized aspects of self concept. Whether or not the hypothesized aspects have any correspondence to how subjects will actually respond when presented with the stimuli, is a question subject to empirical investigation.

C. Procedure

The following procedure was employed to investigate the basic construct validation question: How does the factor structure of the instrument correspond to the logically-based structure?

The SAI was administered anonymously in the schools by external examiners rather than classroom teachers. There were two demographic items; sex and level of parents education.

Using a program which employs Camp's (Castellan, 1966; Yale, 1967) a tetrachoric correlation matrix was prepared for each of the following data sets: 7th grade, 4th grade, 7th grade males, and 7th grade females. First, the 7th grade matrix was used as input for the SPSS Factor procedure.

SPSS Type PA2 factoring was employed, a procedure that produces a principal factor solution with communalities estimates (Nie, Bent, and Hull, 1970). This procedure first computes eigenvalues based on a principal components solution, so that the determination of the number of factors to be extracted can be based on the eigenvalue pattern of the matrix with unities in the diagonal. The user can determine the number of factors by setting a minimum eigenvalue below which factors will not be extracted, or by setting an arbitrary number of factors for extraction. Subprogram Factor then substitutes an initial estimate of item communalities in the diagonal of the correlation matrix. The communality estimates ordinarily used are the squared multiple correlation coefficients of each item with the other items. To determine these values, the correlation matrix must be inverted, and its determinant found. In cases where the matrix has a determinant smaller than 10^{-8}, or the matrix is singular and thus has no defined inverse (as is typically the case with a tetrachoric correlation matrix), the largest off-diagonal correlation coefficient of that item with the other items is used as the initial estimate. The reduced matrix is then factored, and the variances accounted for by these factors become the new communality estimates The iteration then begins, and new estimates are substituted for the previous ones in the diagonal. The process is repeated until the differences in two successive communality estimates is negligible. In this study, the criterion used for determining the number of factors was a minimum eigenvalue of 1.0 in the original principal components analysis. This criterion is consistent with those of several writers, including Guttman (1955), and Kaiser (1970). The criterion employed for cessation of iterations was arbitrarily set at .01. In all factoring done in this study, the initial estimate of communality for each item was the largest off-diagonal correlation coefficient.

For the 7th grade matrix, this procedure resulted in the extraction of 20 factors. The eigenvalues above 1.0 from the principal components solution were as follows: 19.29, 5.99, 4.22, 3.85, 2.91, 2.47, 2.04, 1.86, 1.69, 1.54, 1.46, 1.42, 1.32, 1.26, 1.15, 1.10, 1.08, 1.07, 1.04, 1.01. The principal components solution accounted for 72.27% of the variance. A plot of all 80 eigenvalues of the principal component solution was prepared and studied to determine if there might be suggestions regarding the underlying structure from the Scree points (Cattell, 1966). The eigenvalues of the 20 factor principal axis (communality) solution were plotted on the same graph to allow for comparison (Figure 2). The scree technique is so named because it involves examining the eigenvalue list for those values below which there is a sizeable drop before the next value. In the plot, the curve segments which suggest clusters of factors resemble hill slopes, below which scree, or waste fallen rock bits, would accumulate. The graph shows the complexity of the construct under study, in that there are several distinct breaks in the curve. The graph provides clear support for the existence of four major factors.

Insert Figure 2 about here

There is a sharp drop and change of direction in the curve connecting the values between the fourth and fifth eigenvalue. If the curve which spans the first four eigenvalues were extended, it would not go through the 5th or subsequent eigenvalues without a change in direction. Similarly, there is evidence of a cluster of eight secondary factors, of eight somewhat smaller factors, and possibly of five additional factors before the plot falls into the straight line typical of a family of factors representing sampling error.

In order to explore the factor patterns more fully, varimax rotations were carried out using as input the loading of the first 20 factors, the first 12 factors, and the first four factors of the principal axis solution. Although it was possible to make reasonable interpretations of most of the factors, even in the 20 factor solution, few items clustered on any factor beyond the first ten factors. However, the complexity of the construct and the potential for instrumentation cannot be ignored. As Guttman (1955) argued, the existence of the factors in the principal component solution with eigenvalues greater than 1.00 supports the existence of at least 20 factors in the population of items from which these have been drawn -- perhaps even of 25, as suggested by Figure 2, since Guttman's criterion is a lower bound to the number of factors. By adding items similar to those loading on these weak factors, one might possibly build a 20 or even 25 subscale instrument. However, such an instrument would be extremely long, and probably would not yield a great deal of additional useful information. The 10-factor solution seemed to provide sufficient complexity to guide subsequent analyses, and the 4-factor solution provides a satisfactory way of checking how closely the empirical data correspond to the hypothesized model.

Both the 10-factor and the 4-factor solutions were readily interpretable, as can be seen by examining the rotated factor matrices (Tables 1 and 2) and tables describing the factors (Tables 3 and 4).

Table 4

Description of Factors: All 4-Factor Solutions

Factor Numbers				Description of Factors
4th	7th	7th F	7th M	
2	1	1	1	Positive family relationships
4	2	2	2	Positive peer relationships
3	3	3	3	School: academic competence
1	4	4	4	Denial of negative feelings; positive self-descriptions

Insert Tables 1 - 4 about here

The same procedure was followed with each data set: 4th grade total, 7th grade male, and 7th grade female; and the results were very similar to those from the 7th grade total analysis. The initial factoring for each data set will first be discussed, followed by the description and discussion of all four and ten factor solutions.

For the total 4th grade group, the initial factoring produced 21 factors. The eigenvalues greater than 1.0 for the principal component solution were as follows: 20.32, 4.47, 3.27, 2.87, 2.59, 2.22, 1.92, 1.71, 1.58, 1.51, 1.39, 1.35, 1.26, 1.24, 1.21, 1.16, 1.15, 1.12, 1.06, 1.04, 1.03. These factors accounted for 69.37% of the total variance. Again little of interpretative interest was contained above 12 factors, so varimax rotations of 12, 10 and 4 factors were made (Tables 5 and 6). Since all 4 and 10 factor solutions in the four data sets are similar in the descriptions of factors, they are all included in the same tables.

Insert Tables 5 - 6 about here

The initial factoring of the matrix for 7th grade females produced 21 factors. The eigenvalues greater than 1.0 for the principal component solution were as follows: 19.79, 6.76, 4.46, 3.87, 3.40, 2.04, 2.44, 2.08, 2.02, 1.92, 1.80, 1.68, 1.59, 1.41, 1.36, 1.31, 1.26, 1.24, 1.16, 1.10, 1.01,

Table 3

Description of Factors: All 10-Factor

Factor Numbers 4TH	7TH	7TH F	7TH M	Description of
2	1	1	1	Positive family relat
4	2	2	2	Positive peer relatio
3	3	3	3	School: academic com
1	4	4	4	Denial of negative fe
5	5	5	5	Positive self descrip
6	6	7	7	Enjoyment of classroo
7	7		8	Positive self charact liked
10	9	9		Ability to tolerate d
	10	6		Not wishing to be you school
		10	9	Negative behavior at l
			10	Disagreement with fam
10				Participation in home

accounting for 80.8% of the total variance. After examination of the eigenvalues for large drops in value, according to the scree test, varimax rotations of 13 and 4 factors were made. Examination of factors 11, 12, and 13 suggested the examination of a 10 factor solution (Tables 7 and 8). These factors were very similar to those revealed in the 7th grade total solutions.

The initial factoring of the 7th grade male matrix produced 22 factors. The eigenvalues greater than 1.0 for the principal components solution were as follows: 19.15, 5.91, 4.70, 3.60, 2.89, 2.64, 2.21, 2.00, 1.78, 1.69, 1.59, 1.47, 1.39, 1.33, 1.32, 1.24, 1.23, 1.15, 1.09, 1.07, 1.05, accounting for 77.4% of the common variance.

Ten Factor Solution

In all seventh grade data sets, the first three factors of the 10 factor solution were clearly composed of items postulated to be on the Family, Peer, and School subscales (Tables 1, 7, and 9). Factor 4 contained nearly equal numbers of items from the four postulated subscales. It was a "general" factor, but not the same General factor postulated in the construction. From the item content, this factor was described as denial of negative feelings. Factor five contained items with general positive self referrent statements. A sixth factor of important interest was composed almost entirely of items postulated to be on the original School subscale. However, these items had low loadings on factor three, which contained the other school items. Examination of this second school factor, Factor 6, showed that it represented School: enjoyment of the classroom situation, and that this factor was relatively independent of the factor School: academic competence. That is, items postulated on the school subscale had high loadings on one or the other of these school factors, but not on both. Thus, the original School subscale gave unequal weighting to two important aspects of feelings about the self in a school setting.

Insert Tables 7, 8, 9 about here

The remaining four factors were of some interest, but probably lesser importance in a school setting. Factor 7 included other positive statements about self; factor 8 was characterized as indicating complacency, factor 9: ability to tolerate disagreement and factor 10: desire not to be younger, nor to drop out of school. Thus, six meaningful and fairly large factors emerged from a study of the factor solutions of the 7th grade data, and four additional factors of some interest. In the 4th grade group, factors were similar to the 7th grade solutions, with two exceptions; (1) the first and largest factor in the 4th grade solution was the general factor, which appears as factor four or five in the 7th grade solutions; (2) the school: enjoyment of classroom situation factor contained a few items related to desire to be liked. Thus, from all data sets, there were factors of interest beyond the four postulated subscales. Of these, six were determined to contain sufficient items and to be of sufficient importance to use as a basis for further development of the instrument. These were as follows: Positive peer relationships (Peer), Positive family relationships (Family), School: academic competence, Denial of negative feelings toward self, General positive self description, and School: enjoyment of classroom situation.

Four Factor Solutions

Following these comparisons of the larger factor matrices, the four factor solutions for all data sets were examined for their correspondence with the structure postulated in the construction of the instrument (Tables 2, 4, 8, and 10). In all data sets three strong factors emerged; Family, Peer, and School, composed primarily of postulated items. The fourth, or

Insert Table 10 about here

general factor was composed of items from all four postulated subscales, and includes the two sets of items with positive and negative self referent statements that appear as separate factors in the 10 and 12 factor solutions. It is possible that there is a loss of valuable information by combining these two scales in this manner. The construction of the Self-Description Inventory (SDI) by Wahler (1968) has relevance here. The Self-Description Inventory was designed "to measure the degree to which S^s differentially emphasize favorable and unfavorable attributes in self-description" (Wahler, 1968). The instrument contains two subscales; the F_a contains description of favorable attributes ascribed to self, and the U_f contains attributes unfavorable to self. A series of clinical studies in an academic and a psychiatric setting indicated support for the psychological importance of very high or very low scores in combination on these two scales, or of combinations of elevation on one scale and a middle range score on the other. Since the scales are moderately correlated, there is information in a scale that combines them. However, it seems reasonable to retain them as separate scores. In the two general subscales on factors four and five of the SAI, it seems reasonable to retain them as separate subscales, since there is additional information to be gained. Thus in terms of the 4 factor model for the SAI, there is support for the four factor model, but evidence that it could be improved by extending and modifying it.

Selection of Items for Instrument Revision

On the basis of the factor structure in the four and ten factor solutions of the three 7th grade data sets, six revised subscales were postulated: Positive peer relationships (Peer), Positive family relationships (Family), School: academic competence, Denial of negative feelings toward self, General positive self description, and School: enjoyment of classroom situation. In order to provide an item pool that would provide clear and relatively independent measures of these six factors, 60 items were selected from the 80 item instrument that had the highest loadings on these six factors, and lowest loadings on other factors. Those items omitted loaded on more than one factor, or had lower communalities than the selected items. Two of these new subscales (Family and Peer) are identical in description to the postulated subscales in the original construction. All items on these new scales were also contained on the originally postulated subscales. Two other subscales are factors of one of the postulated subscales. Two other subscales are factors of one of the postulated school subscales. They are termed School: academic competence, and School: enjoyment of classroom situation. The remaining two factors include some items originally postulated on all four subscales. Both factors are composed of self evaluative items, but one factor included only items involving denial of negative feeling, and the other included only items with positive self reference. The existence of two such aspects of self description has support in the literature on motivation (White, 1959) and in development of the SDI instrument (Wahler, 1968).

After the postulation of a revised scale of these 60 items, tetrachoric correlation matrices were prepared using the four data sets, with only the 60 selected items. These matrices were used as input for the SPSS subprogram Factor. In the 7th grade data set, there were 12 factors with eigenvalues greater than 1.0, as compared with 20 when the total 80 item matrix was factors: 16.76, 4.74, 3.95, 3.02, 2.38, 1.84, 1.61, 1.37, 1.22, 1.18, 1.09, 1.07.

Next rotations of 6 and 7 factors were made using varimax rotation (Tables 11 and 12). The six factor solution was used since the revised instrument postulated six subscales. The seven factor solution was employed as an empirical check, to ascertain whether a sizeable amount of variance lay just "over the rim" so to speak, of the 6 factor hyperspace. This did not appear to be the case. The seventh factor was negligible in content containing 3 items which had sizeable loadings on other factors.

Insert Tables 11 and 12 about here

The six factor solution was examined in detail. In every instance highest loadings on each factor were on the items postulated in the revision

Table 12

Description of Factors Revised Scale
6 Factor Solution

Factor numbers for all data sets				Description
4th	7th	7th M	7th F	
1	1	1	1	Positive relationships with family
2	2	2	2	Positive relationships with peers
4	3	3	3	School: academic competence
3	4	4	5	Denial of negative feelings
5	5	5	4	Positive self-description
6	6	6	6	School: enjoyment of classroom situation

process. Very few items even loaded at all on scales other than the one on which they were postulated to fall. This result would be expected to some extent, since the items for the revised scale were actually chosen to sharpen the factors identified in the analysis of the 80 item scale and the sample of students was used in the analysis. However, the cleanness of the factor structure was even greater than had been expected.

The procedure was repeated for the 7th grade male data set. The 6 factor solution was very similar to the 7th grade total solution.

The matrix for 7th grade females was factored by the same procedure. There were 13 factors extracted with eigenvalues in excess of 1.0 in the principal components solution, and they accounted for 75.2% of the total variance. The six factor solution gave results very similar to the total 7th grade solution (Table 14). However, on the N factor (Denial of negative feelings), in addition to all 10 of the N subscale items, there are 12 other items; four from scales F and 10 from P, and one each from S and G. Since the N factor is composed of items which involve the denial of negative feelings toward self, it may be that in women, this factor is highly related to positive relationships with peers and family. The items from the P subscale that loaded on the predominantly N factor were examined. All six had their highest loadings on factor 2, the P factor, and all have some aspect also of denial of negative feeling.

Insert Table 14 about here

Next, the 4th grade matrix was factored, using the procedure employed with the 7th grade data sets. Thirteen factors were found in the principal components solution with eigenvalues in excess of 1.0 and they accounted for 64% of the total variance. The six factor solution was again examined in detail (Table 15). All but one of the items proposed for the revised subscale Family (F), loaded on the first factor. The one item with a low loading had a small variance for the 4th grade population. Several items from other subscales loaded also on factor 1, making it appear a more general factor than the 7th grade first factor. It will be recalled that Lin's (1964) study showed the same type of factor structure for 4th graders as compared with (in his case) 8th graders; that is, one general factor emerges first in the younger group. The remaining fourth grade factors were composed primarily of postulated items, but a few items fall on each factor that had been postulated to fall on another subscale. It did appear that the basic factor structure was supported. To determine whether a better fit could be obtained, the factor matrix of 6 factor solution was obliquely rotated to a direct oblimin criterion. Delta values of -3, -2, -1, and 0 in the criterion formula

Insert Table 15 about here

$$\sum_{p<q=1} \left(\sum_{j=1}^{n} a_{jp}^2 a_{jq}^2 - \frac{\delta}{n} \sum_{j=1}^{n} a_{jp}^2 \sum_{j=1}^{n} a_{jq}^2 \right)$$

were selected where a's are factor pattern loadings, and o is an arbitrary value to control obliqueness (Nie, et. al., 1971). These values gave solutions ranging from most nearly orthogonal to most oblique respectively. The solutions for $\Delta = -1$ and $\Delta = 0$ both produced good fits to the postulated structure. It was decided that a delta value between these two might be a better solution, so $\Delta = -.5$ was used, and this turned out to be the case (Table 16).

Insert Table 16 about here

An index of factorial similarity (Mulaik, 1972) was computed for the $\Delta = -.5$ oblique solution, and the varimax 7th grade solution. The value of the index was .11, which can be interpreted as the average distance between the respective factors being compared. It means that the respective factors are close together, since if they coincided the value would be zero, and the maximum value for divergent factors would be $\sqrt{2}$, or 1.414. As support for this procedure it should be noted that Mulaik (1972, p. 356) pointed that when factor solutions based on different populations are being compared with similarity indices, one should be an oblique rotation, since an orthogonal solution will not give the best fit in two different populations.

Comparison of 4th and 7th Grade Revised Scale Factors

After the six factor solutions for the 4th and 7th grade were compared to determine whether the items chosen on the basis of their loadings on the seventh grade data set has the same structure in the fourth grade data set, the solutions were further examined to determine whether refinements in this revised scale were necessary. In comparing the first factors of

Table 16 (cont'd)

FACTOR CORRELATIONS

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR 6
FACTOR 1	1.00000	-0.28728	-0.36049	0.23450	-0.30891	0.21374
FACTOR 2	-0.28728	1.00000	0.21355	-0.14537	0.12976	-0.26653
FACTOR 3	-0.36049	0.21355	1.00000	-0.26696	0.35386	-0.32969
FACTOR 4	0.23450	-0.14537	-0.26696	1.00000	-0.36237	0.04442
FACTOR 5	-0.30891	0.12976	0.35386	-0.36237	1.00000	-0.19672
FACTOR 6	0.21374	-0.26653	-0.32969	0.04442	-0.19672	1.00000

these orthogonal solutions, it is oted that three of the postulated items (F01-SC06, F03-SC18, F09-SC62) have loadings slightly below .3 in the fourth grade matrix. However, the same three items had sizeable loadings in the seventh grade matrix, and all three were postulated to be on the original family scale. Thus, it was decided to retain all 12 postulated family subscale items.

The second factor had a sprinkling of items postulated to fall on other subscales. In particular, item N1, which had loadings over .4 on the N scale, also had loadings of .52 and .53 on the 4th grade oblique and 7th grade varimax P factors respectively. This item, "other children are often mean to me," was originally postulated on the Peer scale. It was decided to retain the revised P subscale and add item N1 to it. This resulted in a 12 item revised P subscale, with one item overlapping the N subscale. The six postulated subscales were examined across all orthogonal six factor matrices, and across the 4th grade oblique rotations. The revised subscales were retained with the single item N1 addition to the Peer factor mentioned above (Table 17).

This process seems to insure the inclusion of those items that would be most useful in populations similar to the ones under study, but care should be given to make this model as general as possible. Some items omitted in the selection of items for subscales should probably be included in a complete instrument. The nature of this particular population might have resulted in high p values for certain items which might have much larger variance in another population as in items SC07 and SC75. Also, some of the items on factors in original solution represent important

Table 17

Revised Subscale Items

Subscale Name	SCREVF	SCREVP	SCREVS	SCREVN	SCREVG	SCREVC
New and original item numbers	F1 SC06	P1 SC05	S1 SC03	N1 SC09	G1 SC08	C1 SC23
	F2 SC14	P2 SC21	S2 SC15	N2 SC11	G2 SC16	C2 SC43
	F3 SC18	P3 SC25	S3 SC19	N3 SC28	G3 SC17	C3 SC48
	F4 SC22	P4 SC29	S4 SC27	N4 SC31	G4 SC24	C4 SC59
	F5 SC26	P5 SC37	S5 SC35	N5 SC40	G5 SC33	C5 SC67
	F6 SC38	P6 SC41	S6 SC39	N6 SC52	G6 SC34	C6 SC72
	F7 SC54	P7 SC45	S7 SC47	N7 SC60	G7 SC56	
	F8 SC58	P8 SC49	S8 SC51	N8 SC66	G8 SC64	
	F9 SC62	P9 SC53	S9 SC55	N9 SC68	G9 SC65	
	F10 SC70	P10 SC61	S10 SC63	N10 SC73	G10 SC69	
	F11 SC74	P11 SC77	S11 SC71			
	F12 SC80	P12 SC09				

domains of meaning, but similar items were not included in the instrument. Accordingly, five items were selected for inclusion in the revised scale (Table 18).

Table 18

Items added to Revised Instrument in Total Score

Original Number	New Number	Item
SC 04	REV 1	I am satisfied to be just what I am.
SC 07	REV 2	I usually like my teacher.
SC 32	REV 3	I wish I were younger.
SC 42	REV 4	I know what is expected of me at home.
SC 75	REV 5	I would like to drop out of school.

These items were not added to any of the subscales, but were retained for further research with the instrument.

Scoring and Reporting System

On the basis of the results of the factoring of the revised scale, and the addition of the five items with low variance in these populations, a scoring system was devised for use with a 65 item revised instrument (SCREV65). This system included a total score and six subscores. A total based on the 60 items composing the subscales is also given in this study (SCREV60).

The total score was based on one point given for each of the 65 items. This decision is based on the fact that at least 90% of these items had loadings above .3 on the first unrotated factor of the principal factor solution in all data sets. The six subscale scores are based on the assignment of equal one point weights to the items indicated (Table 17). The revised subscales and the numbers of items on them are as follows: SCREV, 12; SCREV, 12; SCREVS, 11; SCREVN, 10; SCREVG, 10; SCREVC, 6. Reliability of this total score and subscale scores are indicated in Table 19. The reliabilities of the revised subscales are, in general, good. The SCREVC has the lowest reliability as would be expected due to its length. The SCREV 60 and SCREV 65 reliabilities compare favorably with the reliability for the original 80 item total score.

Factor scores were computed by scoring items with weights over 1 on the six factors, and product-moment correlations were computed. These are summarized in Table 20.

Table 20

Summary Table of Factor-Score Correlations

Grade	Range	Median
4th	.42 to .59	.50
7th	.21 to .55	.35
7th Males	.26 to .54	.37
7th Females	.17 to .55	.37

Measure of Construct Validation

Earlier in this paper, the concept of the ratio $\sigma^2 a/\sigma^2 x$ as an index of the proportion of item variance attributable to factor (a) was developed. Consider this expression as it applied to the six factors in the orthogonal 7th grade and 4th grade solutions. Recall that the square roots of these ratios of variances $o^2 a/o^2 x$ are functions of elments of the factor matrix in an orthogonal solution. It has been shown that the items loading on factors 1-6 make sense psychologically, both as distinct factors, and in relation to the self concept construct. We can then consider the sums of squared factor loadings as providing some indication of the construct validity of the instrument, since the factors make sense, and account for a large part of the variance. It is recognized that a different rotation would give somewhat different $o^2 a/o^2 x$ ratios, but since the communalities of the items are constant under orthogonal rotation, the variance accounted for by the total of all six factors should be stable. The variance ratios for all four data sets are shown in Table 21.

Table 21

Percent of Total Variance Accounted for by Six Factor Solutions

4th grade	7th grade	7th grade males	7th grade females
45%	50%	50%	50%

CONCLUSIONS AND RECOMMENDATIONS

The Revised Model

The self is a many faceted perception, and no instrument can attempt to tap all of its dimensions and their relationships. Rather, what has been done here is that an instrument with postulated dimensions based on what is known about how children view themselves in a school setting has been examined, and second, the model to make it more useful for a school setting has been tested and extended. What has emerged is a 65 item instrument with six subscales: I. Positive relationships with family, II. Positive relationships with peers, III. School: academic competence, IV. Denial of negative feelings, V. Agreement with positive statements regarding self, and VI. School: enjoyment of classroom situation.

The view of self-concept represented by the revised instrument and subscales is somewhat more complex than that of the original instrument, and extends possible evaluation of programs by making it possible to obtain scores on two school related factors: academic competence and enjoyment of classroom situation. One can easily imagine the situation where a new instructional program might have its earliest impact on the way students feel about themselves in a classroom situation, and later have some effect on their perceived academic competence. The revision makes it possible to determine whether this is the case. Also, if non-random selection is being made of classrooms for an individualized instruction procedure, those groups whose enjoyment of a classroom situation is strongest might not be the best choices.

The enjoyment of classroom situation subscale should be lengthened to increase its reliability, and given weight comparable to the other factors. One way to approach this problem of lengthening would be to include selected items from another IOX instrument, Attitude Toward School. This instrument was constructed from a postulation of subscales in a manner very similar to the SAI. One of its postulated subscales is entitled: Attitude toward school: classroom. A factor analysis performed on the 60 items SAI revised scale with the addition of the ATS subscale classroom items could determine whether there are items close to the six item enjoyment of classroom situation subscale. Four to six of the best items could then be added to that subscale, making it roughly equivalent in length to the other subscales.

The Two General Self-Referent Factors

The inclusion of two factors with general statements on self, one set positive, the other negative, has support in the literature, and offers potential in appraising the validity of this instrument in a given setting. This potential would need to be researched before using the instrument for such appraisal, but there is theoretical support (Wahlert, 1968), for such interpretation. For current use, subscale 4 should be used as an index of denial of negative feelings about self, and subscale 5 as an index of agreement with positive statements about self. Subsequent research on groups with known characteristics may more clearly tell the relationship between these subscales.

Age and Sex Differences

The comparisons between age and sex groups gave results consistent with previous research in this area (Lin, 1963; Piers and Harris, 1964). The factors found in both age groups were the same, but the factors were less clearly differentiated (mildly oblique) in the 4th grade population. There were a few items that seemed to have different loadings for boys and girls in the seventh grade, but differences were slight, and did not result in changes in the factor structure.

Factor Scores

This study has dealt with the modification of an existing instrument by factoring the item intercorrelation matrices. Factor scores were then presented which assign equal unit weights to the items with moderate to high loadings on the factors. This naturally results in some correlation between the factor scores based on this scoring. (Tables 22 and 23).

Insert Tables 22 and 23 about here

The intercorrelations were somewhat higher in the fourth grade (range .42-.59, median .50 matrix, which would be expected since the most satisfactory fit to the postulated model was found with an oblique rotation.

The factor scores have two major functions: score reporting and research. The factor scores offer good potential of utility, since they have good reliability (Table 19). They can be used for further validation research. On the basis of their construction, they can now be used in a validation approach, involving convergence and divergence of indicators (Campbell and Fiske, 1959), which could not have been done until the subscales themselves were strengthened. Other instruments can be employed with these subscales in a study, and the patterns of intercorrelations evaluated. Such a subsequent validation study is a natural follow-up in the continued process of model testing and extension that develops the construct validity of an instrument.

The factor scores can also be reported along with a total score, and used as estimates of the six dimensions of self concept postulated: positive relationship with family, positive relationships with peers, school: academic competence, denial of negative feelings, agreement with positive statements regarding self and school: enjoyment of classroom situation.

Validation of Criterion-Referenced Instruments

The relevance of this study to the examination of criterion-references (CR) instruments should be discussed. The SPI instrument was designated by its constructors as a criterion referenced instrument (IOX, 1970). However, since it contains items widely used in different norm-referenced instruments, and not specifically written by item generating rules, it was not regarded in this study as having any special claim to content validity based on criterion referenced construction. However, the procedure employed in this validation does have real relevance for CR instruments. Since such instruments are designed by generating items by specific item rules that are related to behavioral objectives, the model testing and extension procedures developed in this paper is particularly applicable for determining whether or not there is empirical support for the postulated structure. This procedure is based on an examination of items generated or selected with certain specifications. This procedure can be applicable to either norm-referenced or CR instruments.

In conclusion, it is recommended that this revised instrument be further revised by extending the subscale entitled School: enjoyment of classroom situation, and that the subscale scoring procedure be employed in further research. The revised instrument and the factors shown in these 4th and 7th grade Iowa children have potential for group assessment of important factors of self-concept in children. It should be noted that this modified model and suggested further development of the instrument are based on current relationships between dimensions of self-perception in children. It may be that if we move in the direction of teaching for the development of positive self-feelings, some of the factors may become much more closely related, or combine. An analogy can be found in intellectual abilities. Cronbach (1971) notes that matehmatical and verbal aptitudes may be highly correlated because they are both given stress in the curriculum. Both of these aptitudes might be more highly related to map-reading skills, if map reading were stressed in the curriculum.

As Kenneth Clark stated in an address sponsored by the U.S. Bicentennial Commission, "We have concentrated on the development of intellect to the extent that we have produced brilliant young leaders devoid of moral commitment, and brought the tragedy of Watergate upon us."

We must concentrate our efforts in education on the development of moral attitudes and values. We must know more of how our students view themselves and the important sources of influence on themselves: their families, peers, school, and the general context in which they function.

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Table 3

Description of Factors: All 10-Factor Solutions

Factor Numbers				Description of Factors
4TH	7TH	7TH F	7TH M	
2	1	1	1	Positive family relationship
4	2	2	2	Positive peer relationships
3	3	3	3	School: academic competence
1	4	4	4	Denial of negative feelings
5	5	5	5	Positive self descriptions; self assuredness
6	6	7	7	Enjoyment of classroom situation
7	7		8	Positive self characterization, desire to be liked
10	9	9		Ability to tolerate disagreement
	10	6		Not wishing to be younger, or to drop out of school
		10	9	Negative behavior at home and school
			10	Disagreement with family expectations
10				Participation in home activities

Table 11

Revised Scale 7th Grade 6 Factor Solution, Factor Matrix, Varimax Rotation

	COMMUNALITY	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR 6
F01	.53124	0.52507	0.01433	0.20538	0.40589•	0.16109	-0.14982
F02	.66323	0.71918	0.24315	0.12942	0.26277	-0.01225	0.03071
F03	.47162	0.56473	0.08614	0.14803	0.29364	0.18753	-0.04453
F04	.63691	0.77695	0.11335	0.09335	0.05594	-0.01216	0.09173
F05	.66818	0.74447	0.17369	0.21309	0.03097	0.17303	0.08642
F06	.42468	0.47956	0.00130	0.14057	0.32385•	0.23606	-0.11974
F07	.46019	0.62239	0.13828	0.09113	0.01544	0.20701	0.06347
F08	.68519	0.76577	0.10128	0.01735	0.13454	0.26154	0.04147
F09	.51964	0.59116	-0.00764	0.11575	0.40801•	-0.00589	0.04392
F10	.55429	0.67376	0.20208	0.13563	-0.01835	0.18646	0.07744
F11	.71565	0.83235	0.04892	0.03092	0.04325	0.06442	0.11241
F12	.66945	0.76639	0.11145	0.14513	0.08505	0.18314	0.08847
P01	.34663	-0.02500	0.49242	0.00380	0.29554	0.15956	-0.02141
P02	.41048	0.02237	0.54152	0.20580	-0.13537	0.18203	0.15141
P03	.62538	0.37926•	0.53824	0.11281	0.41796•	0.04308	0.05055
P04	.49217	0.15030	0.64197	0.10732	0.19921	0.02678	0.07441
P05	.59124	0.08120	0.69678	0.21271	0.23113	0.05887	0.10414
P06	.39936	-0.01907	0.57437	-0.02104	-0.07402	0.13239	0.20256
P07	.81889	0.14407	0.87409	0.11901	0.09185	0.06776	0.05844
P08	.53482	0.12910	0.68425	0.12977	0.12696	-0.01503	0.12953
P09	.72764	0.17895	0.75403	0.06553	0.20114	0.20549	0.20018
P10	.39225	0.07747	0.57598	0.09074	0.21545	-0.01314	0.01133
P11	.27085	0.16473	0.44348	0.01567	0.15729	-0.08110	-0.12437
S01	.45101	0.15865	0.12028	0.60540	0.17869	0.07648	0.08417
S02	.19946	0.05707	0.06293	0.38937	0.06135	-0.04923	0.16559
S03	.34930	0.20526	0.07570	0.33454	0.33850•	0.03858	0.18724
S04	.76475	0.16568	0.05864	0.76731	0.02839	0.37918•	-0.02283
S05	.47397	0.30508•	0.13545	0.44808	0.36570•	-0.01867	0.16640
S06	.48630	0.14051	0.20192	0.62386	0.15769	0.06977	0.08280
S07	.55491	0.17691	0.06254	0.65210	0.09950	0.19438	0.22021
S08	.37730	0.06955	0.01483	0.55961	0.03285	-0.07433	0.22909
S09	.31018	-0.00583	0.10058	0.49643	0.21377	0.06579	0.05963
S10	.89737	0.10623	0.10484	0.90695	0.10584	0.18465	0.08502
S11	.64325	0.19164	0.42546•	0.59515	0.07118	0.20826	0.15124

Table 16

Revised Scale 4th Grade 6 Factor Solution Oblique Rotation δ=-.5

FACTOR PATTERN

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR 6
F01	-0.17204	0.15444	0.14457	-0.43961•	0.08323	0.14134
F02	-0.50736	-0.10370	0.08389	-0.24434	0.23942	0.08876
F03	-0.22254	0.19165	-0.04106	-0.33088•	0.07208	0.02725
F04	-0.68294	0.04349	0.06446	0.11556	0.09276	-0.04050
F05	-0.52731	0.12589	0.05464	0.03382	0.02804	-0.09586
F06	-0.24248	0.30409•	0.19833	-0.29417	0.02407	0.22868
F07	-0.53759	0.09093	-0.05423	-0.00150	-0.00680	-0.09443
F08	-0.68391	0.06927	-0.02943	-0.11320	0.05674	-0.17766
F09	-0.22001	-0.11411	0.06106	-0.23690	0.18648	0.08749
F10	-0.57623	0.14218	-0.00636	-0.07741	-0.02229	-0.18915
F11	-0.69348	0.00969	0.04355	-0.01416	0.07955	-0.06551
F12	-0.51749	0.08019	0.08889	0.10378	-0.01123	-0.03284
P01	0.11222	0.09367	0.01524	-0.11341	0.49062	-0.01560
P02	0.05082	0.25735	0.04182	0.21073	0.16527	-0.23607
P03	-0.29407	-0.1715	0.12198	-0.23521	0.42724	0.02412
P04	-0.06784	0.080[illegible]	0.16946	-0.05540	0.59351	0.10630
P05	0.00189	0.07762	0.04656	-0.07995	0.58289	-0.17391
P06	-0.00097	0.04695	-0.03941	0.09670	0.24102	-0.35456•
P07	-0.18432	-0.04747	-0.06537	0.02683	0.79396	-0.14932
P08	-0.08317	-0.14089	0.07539	0.05607	0.57724	-0.09409
P09	-0.13050	0.08241	0.02219	-0.05525	0.69905	-0.05589
P10	0.04324	0.06980	0.04613	-0.07457	0.57815	-0.03732
P11	-0.09532	-0.14284	0.15983	-0.03558	0.28377	0.02347
S01	-0.01182	-0.14103	0.45269	-0.05096	0.02676	-0.10341
S02	-0.15317	-0.00509	0.00952	0.07600	-0.02092	-0.26672
S03	-0.05212	-0.00707	0.48661	-0.39224•	0.06123	0.06959
S04	-0.12377	0.29829	0.64318	0.07453	-0.02049	-0.02058
S05	-0.22234	-0.03855	0.26910	-0.31463•	0.15681	-0.01106
S06	-0.05042	-0.06911	0.60743	-0.05772	0.10113	-0.01560
S07	-0.11981	0.11380	0.55236	-0.01364	0.00329	-0.12982
S08	0.11854	0.16372	0.62151	0.05073	-0.06646	-0.16459
S09	0.14945	0.08869	0.39884	-0.10219	0.17317	-0.16982
S10	0.00190	0.08940	0.77812	0.04235	-0.06256	-0.16009
S11	-0.03476	0.21908	0.34683	0.04666	0.37257•	-0.20767

Table 16 (cont'd)

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR 6
N01	-0.07672	-0.00100	0.12640	-0.25952	0.52171•	0.16157
N02	-0.14141	-0.12992	0.20552	-0.49971	0.19495	0.01131
N03	0.19984	0.09275	-0.09590	-0.56780	-0.01350	-0.16656
N04	-0.00564	-0.00927	0.18108	-0.54414	0.12947	0.00543
N05	-0.23672	0.00174	0.24270	-0.39704	0.25264	0.09344
N06	-0.14740	0.10668	-0.04467	-0.20574	0.06345	-0.26396
N07	0.08646	0.06496	0.14278	-0.57291	0.12855	-0.06137
N08	-0.15227	0.04599	0.11573	-0.52658	0.04197	-0.01257
N09	-0.33542•	0.01160	0.13308	-0.25259	0.22597	-0.08912
N10	-0.07859	0.05307	0.02087	-0.50512	0.17307	0.01432
G01	-0.25760	0.33025	0.30048•	0.04745	0.24822	0.07851
G02	-0.16318	0.50056	0.04974	-0.11081	-0.04350	-0.07654
G03	-0.13637	0.56302	0.11176	0.07206	0.25429	-0.07622
G04	-0.34410•	0.30430	0.26339	0.01096	0.22489	0.00350
G05	-0.06177	0.58005	-0.04339	-0.22506	-0.17177	-0.05686
G06	-0.37712•	0.41267	0.04896	0.01807	-0.02000	0.04361
G07	-0.09080	0.21685	0.14260	-0.09108	-0.03436	-0.26757
G08	-0.18037	0.48910	0.34438•	0.04930	0.14159	0.00685
G09	0.11914	0.46323	0.11606	-0.35358•	0.19003	-0.01838
G10	-0.18551	0.40934	0.16973	0.05695	0.31962•	-0.12948
C01	-0.02075	0.00109	0.15312	-0.00991	0.00002	-0.38654
C02	-0.05959	0.13453	0.24854	-0.03816	-0.05022	-0.55077
C03	-0.27385	-0.06067	0.09439	-0.06544	0.06983	-0.39955
C04	-0.00320	-0.10518	0.09630	-0.30158•	0.22791	-0.46545
C05	-0.08255	-0.07240	0.29104	-0.11902	-0.07286	-0.34076
C06	-0.23952	0.26249	0.02417	-0.10574	-0.08581	-0.32071

Table 16 (cont'd)

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR 6
N01	-0.28650	0.03039	0.33738	-0.48135	0.64189	0.01092
N02	-0.35082	0.04807	0.42473	-0.62899	0.46973	-0.11215
N03	0.04319	0.14004	0.05358	-0.51132	0.14139	-0.13952
N04	-0.23469	0.12548	0.37042	-0.63913	0.39020	-0.10265
N05	-0.47588	0.18716	0.49299	-0.60499	0.53736	-0.10497
N06	-0.28621	0.24798	0.19565	-0.27961	0.23350	-0.33079
N07	-0.17084	0.18693	0.34415	-0.64950	0.38047	-0.15802
N08	-0.34733	0.20008	0.34037	-0.61587	0.32953	-0.12740
N09	-0.52817	0.20299	0.42832	-0.45103	0.48427	-0.25728
N10	-0.27021	0.17218	0.25190	-0.57892	0.39185	-0.07999
G01	-0.50956	0.47200	0.51315	-0.22764	0.44433	-0.21035
G02	-0.35382	0.58893	0.25488	-0.22276	0.14468	-0.25760
G03	-0.41634	0.66890	0.37702	-0.16713	0.39790	-0.33909
G04	-0.59262	0.48606	0.52791	-0.26561	0.45921	-0.28174
G05	-0.22463	0.61411	0.12079	-0.25256	-0.00004	-0.16656
G06	-0.49358	0.51462	0.24675	-0.13424	0.15224	-0.15839
G07	-0.27244	0.35349	0.32201	-0.18140	0.15793	-0.38908
G08	-0.47573	0.62384	0.54853	-0.20703	0.36342	-0.30126
G09	-0.11765	0.48518	0.10761	-0.43168	0.30401	-0.13121
G10	-0.47737	0.56660	0.46463	-0.21304	0.49498	-0.39455
C01	-0.16121	0.14421	0.29093	-0.07299	0.14039	-0.44220
C02	-0.31071	0.35782	0.48609	-0.19431	0.21389	-0.67534
C03	-0.41276	0.16322	0.35406	-0.18908	0.28226	-0.48968
C04	-0.24831	0.11377	0.38960	-0.41601	0.45017	-0.52808
C05	-0.24490	0.11214	0.42367	-0.19428	0.15640	-0.42601
C06	-0.39048	0.42618	0.27017	-0.18967	0.13220	-0.43765

Table 16 (cont'd)

FACTOR CORRELATIONS

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR 6
FACTOR 1	1.00000	-0.28728	-0.36049	0.23450	-0.30891	0.21374
FACTOR 2	-0.28728	1.00000	0.21355	-0.14537	0.12976	-0.26653
FACTOR 3	-0.36049	0.21355	1.00000	-0.26696	0.35386	-0.32969
FACTOR 4	0.23450	-0.14537	-0.26696	1.00000	-0.36237	0.04442
FACTOR 5	-0.30891	0.12976	0.35386	-0.36237	1.00000	-0.19672
FACTOR 6	0.21374	-0.26653	-0.32969	0.04442	-0.19672	1.00000

Table 19

Reliability Coefficients for Total Score, Revised Total Score, and Original and Revised Subscales

		Grade Level			
Originally Postulated Scales	Number of Items	4th n = 1105	7th n = 1099	7th Male n = 551	7th Female n = 548
Total score	80	.919	.913	.911	.915
Peer Dimension	20	.779	.795	.794	.801
Family Dimension	20	.749	.827	.812	.842
School Dimension	20	.806	.823	.826	.815
General Dimension	20	.742	.728	.709	.746
Revised Scales					
Revised Total	65	.921	.909	.907	.912
Revised Total	60	.918	.907	.901	.910
SCREV F (Family)	12	.728	.801	.786	.816
SCREV P (Peer)	12	.749	.797	.802	.801
SCREV S (School)	11	.767	.796	.788	.797
SCREV N (Negative)	10	.752	.766	.756	.778
SCREV G (General)	10	.746	.689	.695	.683
SCREV C (Classroom)	6	.614	.663	.658	.668