A Multidimensional, Hierarchical Self-Concept Page

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Introduction

The self-concept construct is one of the oldest in psychology and is used widely in many disciplines. Despite its popularity, reviews prior to the 1980s typically emphasized the lack of theoretical basis in most studies, the poor quality of measurement instruments, methodological shortcomings, and a general lack of consistent findings. This situation called into question the usefulness of the self-concept construct.

In dramatic contrast, the last decade has seen considerable progress in theory, measurement, and research. This progress is due in part to a stronger emphasis on a multidimensional self-concept instead of global measures of self.

The purpose of this presentation is to summarize theoretical perspectives leading to the multidimensional, hierarchical model emphasized in subsequent papers. A major focus of this review is to show how this emphasis on a multidimensional self-concept has contributed to theory, measurement, research and practice.

This overview further substantiates the claim that self-concept cannot be understood adequately if its multidimensionality is ignored. I recommend that researchers use well-constructed multidimensional measures of self-concept instead of relying solely on global measures of self.

Models of the Structure of Self-concept

Models of the structure of self-concept have been derived largely through analogy with corresponding models of intelligence. Soares and Soares (1977) proposed models of self-concept in which "theoretical considerations from Spearman, Thurstone, Cattell, Guilford, and Piaget comprise the foundation for the discussion of self-concept theory" (p. 1).

For present purposes, we distinguish between six models of the structure of self-concept (see Figure 1) that have been discussed in the literature and are largely based on analogous models in intelligence research.

A Unidimensional, General Factor Model

The unidimensional or nomothetic position, reminiscent of Spearman's two-factor model, suggests that there is only a general factor of self-concept or that a general factor dominates more specific factors. Thus, for example, Coopersmith (1967) and Marx and Winne (1978) argued that the facets of self-concept were so heavily dominated by a general factor that it could not be adequately differentiated. Further evaluation of these studies, however, reveals that the conclusions may reflect problems in measurement and statistical analysis rather than with the support for unidimensionality of self-concept. More recent research based on stronger instruments and methodology have shown that there are multiple dimensions of self-concept.

In conclusion, there appears to be no support at all for a undimensional perspective of self-concept or, apparently, even a unidimensional perspective of academic self-concept. Critical evaluations of previous research claiming support for the unidimensionality of self-concept suggest that these claims were apparently unwarranted. This conclusion, however, poses a dilemma for many applied researchers who have focused primarily on a general or global component of self-concept. The thorny, unresolved issue about the appropriate definition of the global component of self-concept and the relevance of this construct is addressed later.

Multidimensional Independent and Correlated Factor Models

The independent and correlated factor models both represent self-concept as a multidimensional construct, but differ in the degree to which the multiple dimensions are correlated. A strong version of the independent factor model requires all the factors to be absolutely uncorrelated although it may be reasonable to posit a weak version of model in which the factors are defined to be "relatively" uncorrelated. The independent factor model reflects the antitheses of the undimensional general factor model (Figure 1A) in that it hypothesizes that there is no general self-concept -- at least not in the sense of Spearman's "g." To the best of our knowledge, no self-concept theorists have argued for the strong form of this model, although particularly Soares and

Soares (1977, 1982, 1983) and, perhaps, Marsh and Shavelson (1985) may be interpreted as supporting a weak version of the model.

In summary, there is clear support for a multidimensional model of self-concept, but apparently little or no support for the strong version of the multidimensional independent factor model. Whereas some studies have reported that correlations among first-order factors are "relatively" uncorrelated, most have found correlations among self-concept factors to be at least modest. Even in studies where correlations among the factors are relatively small, however, there is apparent support for a weak hierarchical ordering of the facets of self-concept that seems inconsistent with the logic of even the weak form of the independent factor model.

A Taxonomic Model.

Guilford's structure of intellect model that was apparently the inspiration for the taxonomic model of self-concept proposed by Soares and Soares (1977). The unique aspect of Guilford's model appears to be that the components of self-concept reflect the intersection of two or more facets, each of which has at least two levels. Thus, for example, Guilford's 120 components of intelligence reflect the multiplicative combination of three different facets: 5 operations x 4 contents x 6 products.

Although Soares and Soares (1977) proposed a taxonomic model of self-concept and claimed support for it, it appears that they were actually testing the multidimensional independent factor model described above.

Interestingly, the structural model underlying the design of the Tennessee Self Concept Instrument (Fitts, 1965) represents a multifaceted design. Fitts used a 5 (external frame of reference) x 3 (internal frame of reference) x 2 (positively/negatively worded items). The 5 levels of the external facets -- Physical, Moral, Personal, Family, and Social -- are similar to the self-concept traits proposed in many subsequent instruments. In Fitt's schema, each of these traits could be manifested in relation to three internal frames of reference: Identity (e.g., what I am), Satisfaction (e.g., how I feel about myself), and Behavior (e.g., what I do or how I act). Identity is a private, internal self-concept, whereas Behavior is the self that is observable to others. Satisfaction reflects an actual-ideal discrepancy.

Although Marsh and Richards (1988b) concluded that "the TSCS was not a psychometrically strong instrument when judged by current test standards," the structural model underlying its development is apparently unique in the self-concept literature. The lack of support for this model apparently reflects limitations in the TSCS instrument and it may be possible that some variation of this model can be more successfully operationalized.

Compensatory Model

Marx and Winne (1978) proposed a compensatory model in which the lower-order factors may be negatively correlated under some circumstances . The rationale is that there is an ipsative-like process such that individuals who, for example, are relatively less successful in the academic area tend to perceive of themselves as more successful in physical and social areas. Support for this provocative model, however, is apparently open to counter-interpretations (Hattie, 1992).

Stronger support for the compensatory model comes from Marsh's (1986b) research on the internal/external frame of reference (I/E) model. The model was developed to explain the surprising lack of correlation between Math and Verbal self-concepts that led to the revision of the original Shavelson, et al. model of self-concept, but seems to be consistent with at least the logic of the compensatory model. According to the I/E models individuals form their self-concept judgments in a particular domain by comparing their own competence in that domain with the perceived competences of others in the same domain (an external, social comparison process) and by comparing their own competence in that domain with their own competencies in other domains (an internal, ipsative-like process).

Tests of the I/E have been limited thus far to explaining relations between different areas of academic achievement (e.g., verbal and mathematical) and the corresponding areas of academic self-concept (see Figure 1).

A Multidimensional, Hierarchical Model

The multidimensional, hierarchical model in some respects incorporates each of the other models as a special case. As in the undimensional, global factor model, it hypothesizes a global component at the apex of the hierarchy. Thus, support for the global factor model could also be interpreted as support for a hierarchical model in which the hierarchy is very strong.

At the opposite extreme, support for the multidimensional independent factor model could be interpreted as support for a hierarchical model in which the hierarchy was very weak. Support for the multidimensional correlated factor model automatically implies support for a hierarchical model.

The relations between the taxonomic and hierarchical models is not so clear-cut, but it seems that the two are not incompatible. Indeed, Guilford (1985) posited a hierarchical representation of his taxonomic model of intellect that was apparently the basis of Soares and Soares (1977) taxonomic model of self-concept.

Similarly, the compensatory model does not seem to be inconsistent with a hierarchical model, although it may explain why the self-concept hierarchy is apparently weaker than originally anticipated. Indeed, in their original formulation of this model, Marx and Winne (1980) hypothesized a general higher-order factor and second-order domain specific factors.

In summary, the multidimensional hierarchical model is apparently consistent -- or at least not incompatible -- with each of the structural models. This flexibility, however, is both a strength and a weakness. It is a strength because it provides a broad framework for exploring the structure of self-concept. It is a weakness because the hierarchical model, at least at the level of abstraction considered thus far, may not be falsifiable. Hence, it is critically important that a priori hierarchical models of self-concept are specified in sufficient detail to enable them to be rigorously tested. For this reason, we now turn to the hierarchical model proposed by Shavelson et al and its subsequent refinements.

The Shavelson et al. Model

Prior to the 1980s, reviewers noted inadequacies in theoretical models of self-concept and instruments used to assess it. To remedy this situation, Shavelson et al. (1976) reviewed existing research and self-concept instruments, and developed a multifaceted, hierarchical model of self-concept.

Self-concept, broadly defined by Shavelson, is a person's perceptions of him/herself. It is formed through experience with and interpretations of one's environment. It is especially influenced by evaluations by significant others, reinforcements, and attributions for one's own behavior.

Self-concept is further defined by seven major features:
1. It is organized or structured. People categorize the vast amount of information they have about themselves and relate these categories to one another.
2. It is multifaceted. The particular facets reflect a self-referent category system adopted by a particular individual and/or shared by a group.
3. It is hierarchical. Perceptions of personal behavior at the base move to inferences about self in subareas (e.g., English and mathematics components contribute to academic self-concept) and then to inferences about general self
4. At the apex of the model the hierarchical general self-concept is stable. As one descends the hierarchy, however, self-concept increasingly becomes situation specific and less stable.
5. Self-concept becomes increasingly multifaceted as the individual moves from infancy to adulthood.
6. Self-concept has both a descriptive and an evaluative aspect. Individuals may describe themselves ("I am happy") and evaluate themselves ("I do well in mathematics").
7. Self-concept can be differentiated from other constructs such as academic achievement.

The Shavelson et al. Model

Shavelson et al. (1976) also presented one possible representation of their hierarchical model.

General-self appears at the apex and is divided into academic and nonacademic self-concepts at the next level.

Academic self-concept is divided into self-concepts in particular subject areas (e.g., mathematics, English).

Nonacademic self-concept is divided into three areas: Social self-concept, which is subdivided into relations with peers and with significant others; Emotional self-concept; and Physical self-concept, which is subdivided into physical ability and physical appearance.

Further subdivisions are hypothesized so that at the base of the hierarchy self-concepts are of limited generality, quite specific, and closely related to actual behavior.

This structure of self-concept resembles the hierarchical model of intellectual abilities (Vernon, 1950) in which general ability is at the apex.

The Shavelson et al. Model

The Shavelson et al structure was heuristic and plausible, but was not supported by empirical research.

They found only modest support for the separation of self-concept into social, physical, and academic facets in existing instruments. No one instrument clearly differentiated even these three facets.

Furthermore, the multifaceted nature of self-concept was not accepted widely by other researchers. Some researchers argued that self-concept was so dominated by a general factor that separate facets could not be differentiated.

Byrne (1984, pp.449-450) concluded that: "Many consider this inability to attain discriminant validity among the dimensions of SC to be one of the major complexities facing SC researchers today."

More recently, researchers have developed self-concept instruments to measure specific domains that are at least loosely based on an explicit theoretical model and then used factor analysis to support these a priori domains (e.g., Boersma & Chapman, 1979; Fleming & Courtney, 1984; Harter, 1982; Hattie, 1992; Marsh, 1989a; 1990c; Soares & Soares, 1982).

Reviews of this research (Byrne, 1984; Marsh & Shavelson, 1985; Marsh, 1990c) support the multifaceted structure of self-concept and indicate that self-concept cannot be adequately understood if its multidimensionality is ignored.

The Development of the SDQ Instruments

Self-concept research can be broadly divided into two categories:

Within-network studies explore the internal structure of self-concept. They test the dimensionality of self-concept and whether the construct has consistent, distinct multidimensional components (e.g., physical, social, and academic). Empirical techniques such as factor analysis or multitrait-multimethod (MTMM) analysis are used.

Between-network studies attempt to establish a theoretically consistent, logical pattern of relations between measures of self-concept and other constructs.

The resolution of some within-construct issues is a logical pre-requisite to between-construct research, but between-network research has predominated self-concept research.

When I began developing the Self Description Questionnaires (SDQ) I reasoned that the determination of theoretically consistent and distinguishable domains of self-concept should be prerequisite to the study of how these domains, or overall self-concept, are related to other variables. I rejected atheoretical and purely empirical approaches to instrument construction. I began with Shavelson et al's theoretical model as a basis for instrument construction, and used empirical results to support, refute or revise the instrument and the theory upon which it is based.

Theory building and instrument construction are inexorably intertwined. Each will suffer if the two are separated. Consistent with this approach, SDQ research provided support for the Shavelson et al. model, but also led to its subsequent revision.

The Development of the SDQ Instruments

There are SDQ instruments for preadolescents (SDQI), adolescents (SDQII), and late-adolescents and young adults (SDQIII). The self-concept scales in each instrument were derived largely from the Shavelson et al. model.

Many of the scales are common to all three SDQ instruments (e.g., Physical Abilities). Consistent with the Shavelson et al. hypothesis that self-concept becomes increasingly differentiated with age, the number and diversity of self-concept domains increases across the three instruments.

I began by evaluating the within-network components of the Shavelson et al model and the psychometric properties.

The internal consistency of the scales from the three SDQ instruments is good -- typically in the .80s and .90s.

The stability of SDQ responses is also good, particularly for older children. For example, the stability of SDQIII scales measured on four occasions varied from a median of .87 for a one-month interval to a median of $r = .74$ for intervals of 18 months or longer.

Dozens of factor analyses of diverse samples differing in gender, age, country, and language have consistently identified the factors that each SDQ instrument is designed to measure.

I factor analysed 12,000 sets of responses from the normative archives of the three SDQ instruments. All scales from each of the three SDQ instruments were clearly identified. The domains of self-concept are remarkably distinct (median rs among the SDQ factors vary between .1 and .2 for the three SDQ instruments.)

The Marsh/Shavelson Model

The SDQ results provide strong support for the Shavelson et al. model and the multidimensionality of self-concept. They also pose some complications.

The strong hierarchical structure posited by Shavelson et al. requires self-concepts to be substantially correlated, but the small correlations actually observed implies that any hierarchical structure of the self-concept responses must be much weaker than anticipated.

Of particular relevance to my presentation, Math and Verbal self-concepts were assumed to be correlated substantially so that they could be described in terms of a single higher-order academic self-concept.

Factor analyses, however, result in correlations between Verbal and Math self-concepts that are close to zero and led to the Marsh/Shavelson revision of the Shavelson et al. model.

The Marsh/Shavelson Model

I evaluated the hierarchical ordering of SDQ responses. There was strong support for the first-order factors that each instrument was designed to measure.

There were, however, complications in the hierarchical structure. In particular, consistent with the near-zero correlation between math and verbal self-concept, I found that two second-order academic factors -- Math/academic and Verbal/academic -- were needed instead of the one second-order academic factor posited by Shavelson et al.

The results were consistent with Shavelson et al.'s assumption that self-concept is hierarchically ordered. However, the particular form of this higher-order structure was more complicated than originally proposed. This led to the Marsh/Shavelson revision of the Shavelson et al. model.

Marsh, Byrne, and Shavelson (1988) more fully tested the Marsh/Shavelson model with the verbal, math, and general school scales from three different self-concept instruments -- the SDQIII and two other instruments. Support for the Marsh/Shavelson model over the original Shavelson model was found for all three self-concept instruments.

The Academic SDQ Instrument

I proposed a stronger test of the Marsh/Shavelson model:

first-order factors corresponding to a wide variety of "core" school subjects (e.g., history, science, commerce, computer science) can be identified in addition to the Math and Verbal scales on the SDQ instruments.

correlations among the first-order factors can be explained by just two higher-order factors.

I constructed the Academic Self Description Questionnaire (ASDQ) II. It measures self-concepts corresponding to 15 high school subjects taken by all students in the study.

Factor analyses identified all 15 ASDQ II scales, demonstrating that academic self-concept is remarkably domain specific. Two higher-order factors explained relations among core academic subjects. Additional higher-order factors were needed, however, to explain self-concepts in other, noncore subjects (e.g. Physical Education, Art and Music).

Similar results were obtained with the ASDQI instrument designed for elementary school students, although this instrument contained fewer scales.

Even for models based on only the core academic components, the hierarchy was weak. Much of the variance in specific subject self-concepts was unexplained by the higher-order factors. Researchers should use specific self-concept scales appropriate to their particular study.

Perhaps the most remarkable finding was that factor analyses so clearly identified so many distinct components of academic self-concept.

In Search of a General Self Concept.

The emphasis of SDQ research has been on the multifaceted nature of self-concept. There also is a need, however, for theoretical and empirical research examining an overall, total, or general self-concept. Whereas such a construct is inferred widely, it typically is ill-defined and probably is the basis of many inconsistent findings in self-concept research.

Four possible operationalization of general self-concept are:

1) An agglomerate self-concept: a total score for a broad, typically ill-defined collection of self-report items.

2) A relatively unidimensional self-concept scale refers to a separate, distinguishable facet that is comprised of characteristics such as self-confidence and self-competence. This type of general self-concept is sometimes referred to, albeit ambiguously, as self-esteem.

3) A higher-order self-concept is an inferred construct which is not measured directly. The general self-concept that appears at the apex of the Shavelson et al. model and the general factor in the hierarchical factor analyses of the SDQ responses described earlier are examples of this use.

4) A weighted-average general self-concept is based on the assumption that the contribution of a specific component of self-concept to overall self-concept should be based on the saliency or importance of the specific component to a particular individual.

5) A discrepancy model where general self is defined as a function of differences between actual and ideal self-concepts.

Other directions and relations with other constructs.

Research reviewed here has focused on the internal structure of self-concept responses and relations with academic achievement. There also exists, however, a large body of research demonstrating a logical pattern of relations between multiple dimensions of self-concept and other constructs.

Employing the logic of construct validation, specific validity criteria should be substantially correlated with the specific areas of self-concept to which they are most logically or theoretically related, and substantially less correlated with other areas of self-concept.

The demonstration of this type of pattern for a wide variety of external criteria provides strong support for the construct validity of the self-concept responses and particularly for the multidimensionality of the self-concept construct. Whereas an extensive review of this research is beyond the scope of this overview each of the brief summaries illustrate this principle (see Marsh, 1990c, 1993 for more detailed summaries).

Relations to gender.

Gender is weakly related to overall, general, or total self-concept. This lack of relation, however, reflects well defined gender differences in specific areas of self-concept -- some favoring women and some favoring men -- that cancel each other in the formation of total scores.

For example, girls and women consistently have higher Verbal self-concepts and lower self-concepts in Physical ability. Reliance on an overall measure of self-concept does not accurately reflect these content-specific gender differences in multiple dimensions of self-concept (Marsh, 1989).

Relations to masculinity (M), femininity (F), and androgyny.

Central postulates in androgyny research (e.g., Marsh & Myers, 1986; Marsh & Byrne, 1991) are that M and F are differentiable constructs and that both M and F contribute to higher levels of self-concept. Whereas appropriately constructed instruments provide clear support for the differentiation of M and F, most research has shown that F is not related to general measures of self-concept after controlling for the effects of M.

Marsh and Byrne, however, demonstrated that this apparent lack of support for the importance of F was due in part to an over-reliance on general self-concept measures that emphasize stereotypically masculine characteristics such as self-confidence, assertiveness, and a sense of agency. When measures of M and F were related to multidimensional self-concept measures, there was support for a logical, a priori pattern of relations leading to the development of the differentiated additive androgyny model.

Consistent with this model, the relative contributions of M and F varied substantially for different areas of self-concept and F contributed more positively than M for self-concept domains that were more stereotypically feminine. Support for the model was consistent across responses by males and females, across self-responses and responses by significant others, and across five age groups in early-to-middle adolescence. Although the focus of this research has been on androgyny measures, it provides strong support for the need to consider multiple dimensions of self-concept. Relations with M and F cannot be adequately understood if the multidimensionality of self-concept is ignored.

Marsh and Myers further argued that M and F should also be considered as multidimensional, hierarchically ordered constructs and proposed a theoretical model of M and F that was based substantially in the original Shavelson et al model.

Big fish little pond effect.

A growing body of research (see Marsh, 1987a, 1991, 1993; Marsh & Parker, 1984) demonstrates that attending academically selective schools in which the average ability of other students results in a lowered academic self-concept.

Furthermore, there are a variety of other negative effects associated with attending selective schools (e.g., lower educational aspirations, reduced likelihood of taking advanced coursework, lower academic achievement) that are substantially mediated by the reduced academic self-concept. These social comparison effects, however, are very domain specific in that there is little or no effect on nonacademic and general components of self-concept.

Relations to self-concept inferred by significant others.

Ratings by others have been used widely to validate self-concept responses, but empirical support for self-other agreement has typically been weak (i.e., rs of about .2).

The problem, however, is apparently related to an over-reliance on general measures of self-concept and psychometrically weak instruments that attempt to infer specific self-concept domains from single-item scales.

When both subjects and significant others complete a psychometrically strong instrument in which multiple dimensions are each inferred from multi-item scales, self-other agreement is substantially stronger than typically found and is very content specific.

Marsh and Byrne (1992), for example, reported that the average self-other correlation for the 13 SDQIII scales was .56 in two different studies. MTMM analyses provided strong support for the convergent and divergent validity of responses in both studies. In both studies, self-other agreement on general self-concept tended to be weaker than for the other self-concept scales.

Relations to interventions designed to enhance specific areas of self-concept.

Different interventions designed to enhance specific areas of self-concept have been shown to have more impact on those areas of self-concept than on other areas of self-concept (e.g., Craven, Marsh & Debus, 1991; Marsh & Peart, 1988; Marsh & Richards, 1988a; Marsh, Richards and Barnes, 1986a, 1986b). This pattern of relations also provides a control for placebo-like effects that are posited to influence all areas of self-concept.

Thus, for example, academic interventions have substantial effects on academic components of self-concept but little effect on non-academic components whereas physical interventions have substantial effects on physical self-concept but little effect on academic components of self. Considerable information would have been lost if these interventions had been evaluated in terms of just an overall, general, or total self-concept score.

Multifaceted Structure of Self-Concept: Summary

Self-concept, like many other psychological constructs, suffers in that "everyone knows what it is" and researchers have not felt compelled to provide any theoretical definitions or psychometric properties of their measures. In contrast, the SDQ instruments are based on a strong theoretical and empirical foundations.

SDQ research has shown self-concept to be a multidimensional, hierarchical construct. This research has led me increasingly to the conclusion that general self-concept -- no matter how it is inferred -- is not a particularly useful construct. General self-concept does not reflect adequately the diversity of specific self facets.

If the role of self-concept is to better understand the complexity of self in different contexts, to predict a wide variety of behaviors, to provide outcome measures for diverse interventions, and to relate self-concept to other constructs, then the specific facets of self-concept are more useful than a global indicator.

Interestingly, work leading to the Marsh/Shavelson revision suggests that these criticisms of an over-reliance on general self-concept also apply to the usefulness of a general academic self-concept. I am not arguing that researchers should not use global self-concept measures, but rather that more emphasis needs to be placed on content specific dimensions of self-concept. Further support for this recommendation comes from the evaluation of between-network studies that relate general and content specific dimensions of self-concept to other constructs .

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Table 1
Scales From SDQ Instruments: Reliabilities & No. of Items

	SDQ Instruments		
Scales	SDQI	SDQII	SDQIII
Physical Abilities	.85 (8)	.85 (8)	.94 (10)
Physical Appearance	.90 (8)	.90 (8)	.90 (10)
Peer Relationships	.86 (8)	---a	---
Opposite Sex Relationships	---	.90 (8)	.92 (10)
Same Sex Relationships	---	.86 (10)	.87 (10)
Honesty/Trustworthiness	---	.84 (10)	.74 (12)
Parent Relationships	.86 (8)	.87 (8)	.89 (10)

Spiritual Values/Religion	---	---	.95 (12)
Emotional Stability	---	.83 (10)	.89 (10)
Read/Verbal	.92 (8)	.86 (10)	.86 (10)
Math	.92 (8)	.90 (10)	.94 (10)
School	.88 (8)	.87 (10)	.92 (10)
Problem Solving	---	---	.84 (10)
General	.83 (8)	.88 (10)	.93 (12)

a The "---" indicates that the scale was not included on this instrument.

Table 2
Factor Analyses of Each SDQ Instrument

SDQ Instruments	SDQI	SDQII	SDQIII
Number of Factors	7	11	13
Target Loadings			
Number of Coeff.	28	51	68
Lowest	.46	.48	.44
Highest	.86	.80	.94
Median	.73	.68	.71
Nontarget Loadings			
Number of coeff.	168	510	716
Lowest	-.03	-.12	-.17
Highest	.20	.27	.25
Median	.03	.03	.02
Factor Correlations			
Number of Coeff.	21	55	78
Lowest	.04	-.03	-.06
Highest	.47	.39	.36
Median	.13	.15	.10

Note. Results are based on separate factor analyses of responses to each of the three instruments. Target loadings are the factor loadings for the measured variables designed to measure each factor, whereas all other factor loadings are nontarget loadings. For each measured variable there is one and only one target loading (i.e., each variable is designed to measure only one factor). Factor correlations refer to correlations among the oblique factors and will typically differ somewhat from the correlations among computed factor scores used to represent each of the factors.