Stage Order and Dominance in Adolescent Vocational Decision-Making Processes: An Empirical Test of the Tiedeman–O’Hara Paradigm

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Multidimensional scaling procedures were applied to checklist measures of stages from O. V. Tiedeman and R. P. O’Hara Career development: Choice and adjustment, New York: College Entrance Examination Board, 1963, vocational decision-making paradigm. Responses from two high-school samples were analyzed in order to test the hypotheses that stages are ordered as theory predicted and that stages represent dominant psychological states. The stage order hypothesis was essentially supported by findings from scaling solutions applied to two 11th-grade and one ninth-grade sample. The important exception was that the last two stages were reversed. Apparently grade level was not the dimension on which stages unfolded. The stage dominance hypothesis was not supported by the evidence. Student responses were not predominantly associated with a single stage but rather were distributed over several stages. Both results were interpreted in terms of the theory and the instruments. A second conclusion was that metric unfolding is a useful method for analyzing cross-sectional data bearing on construct validity for ordered stage constructs.

Tiedeman (1961) and Tiedeman and O’Hara (1963) proposed a unique language for the analysis of career development. Their explicit intent was to offer a set of concepts which they felt were needed as “primitive terms in a science of career development” (Tiedeman & O’Hara, 1963, p. v). The concepts were arranged in a paradigm that described the processes involved in each of several decisions that are generalized into career development.

These processes are divided into two periods that are further subdivided into seven stages. The periods distinguish between behaviors prior to and following instrumental action on the decision. The four stages in the Anticipation period are named, in order, Exploration, Clarification, Choice, and Implementation; the three under Implementation are Induction, Transition, and Maintenance (Tiedeman & O’Hara, 1963). Each

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237
Fig. 3. Nonmetric Multidimensional Scaling Solution For Four VDMC Vocational Decision-Making Stages, Sample 2, \(N = 94\).

TABLE 3
Correlation Matrix, Recovered Factor Loadings, and Estimated Variances For VDMC Vocational Decision-Making Stage Scores, Sample 2—11th Graders \(N = 74\)

<table>
<thead>
<tr>
<th>Stage</th>
<th>(M)</th>
<th>(SD)</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
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<td>3.30</td>
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<td>1.000</td>
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<td>Crystallization</td>
<td>3.62</td>
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<td></td>
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Factor loadings

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Estimated variances

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<th>Error</th>
<th>Estimated reliability</th>
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<tr>
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<td>Crystallization</td>
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<td>.613</td>
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<tr>
<td>Choice</td>
<td>2.232</td>
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<tr>
<td>Clarification</td>
<td>1.705</td>
<td>1.037</td>
<td>.622</td>
</tr>
</tbody>
</table>

Note. \(X^2\) goodness of fit \((df = 2) = .333, p < .846\).
Second, the metric unfolding method shows promise in ordering stages as a supplement to hard-to-obtain longitudinal data.

Although the unfolding results suggest that VDM stages fall in a definite order, other data caution against assuming that the order in which they unfold is one of time. The distributions of dominant stages, i.e., the high-scoring stage with tied stages rated down, were compared for the 9th and 11th classes in Sample 2. No significant difference was found ($\chi^2(3) = 1.19, p > .10$). Students were distributed across stages in about the same proportion for each grade.

**Stage Dominance Hypothesis**

The stage dominance hypothesis was tested using the difference between highest and next highest stage scores as a rough index of dominance. Differences were calculated for all students in Sample 2 ($N = 311$). A zero difference score was obtained for 115 students (37%) and a difference of 1 for another 119 (38%). Differences of 2, 3, 4, and 5 were obtained for 51, 18, 7, and 1 students, respectively. Stage difference scores of 2 or greater—the a priori criterion level—were obtained for only 45% of the sample. Therefore the data do not appear to support the stage dominance hypothesis.

**DISCUSSION**

The metric scaling procedure used in this study has been shown to be useful for testing hypotheses about the construct validity of the stage construct. This method is not a substitute for longitudinal data demonstrating orderly passage of individuals through stages. However, it can help to support or refute the validity of the stage construct as a way of constraining developmental changes.
Stage order in the Tiedeman–O’Hara paradigm was generally supported by the results. Data on two instruments from three independent samples analyzed by two multidimensional unfolding procedures show remarkably similar stage orders. The results converge on the conclusion that vocational decision-making stages are ordered as Exploration, Crystallization, Clarification, and Choice. The latter two stages are reversed from theoretical order. This finding is difficult to reconcile logically with the theory since the Clarification stage was construed as a state of post-choice closure and specification separating the feeling of commitment from the act of entering a new position in the Implementation Phase. Nevertheless we will offer a possible explanation rather than abandoning the theoretical order.

The onset, duration and drop in the intensity of psychological states portrayed in Fig. 1 may need to be reconsidered. If the Clarification stage reaches a peak in intensity earlier than does Choice, as the data suggest, and if that state reflects post-choice closure, perhaps the Choice stage emerges earlier but with a gradual rise, peaks at a lower point and recedes at a slow rate. Thus theoretical order may account for onset and duration while the results account for order of the peaks. Since the data did not support stage dominance, apparently peaks were not prominent. Future research will need to consider not only the ordering of stage peaks but also the ordering of their emergence and decline.

The caution against interpreting the dimension along which the stages unfold as time is based on the cross-sectional data from Sample 2 ninth and 11th graders. Longitudinal data would seem to be the only certain way to approach this issue. Perhaps ninth and 11th graders are more alike than different in their vocational decision-making processes. Put another way, perhaps stage transitions—particularly from Exploration to Crystallization—are likely to occur after 11th grade for most adolescents.

An alternative interpretation about the unfolding dimension may be that it reflects personality style or decision-making style. The “stages” may unfold as persistent problem-solving styles or particular styles in approaching the occupational choice problem. Thus Choice stage scores may reflect something like a rational, deliberative style. Likewise the Exploration stage may reflect casual, even playful, approach to problems. These styles may be ordered along an hypothetical dimension. Follow-up studies are needed to cast light on the predictive meaning of the stage scores.

The question of how many stages comprise vocational decision-making processes has been answered several ways since 1963. Apparently the original paradigm stages were proposed at an implicit level useful for logical analytical purposes (Tiedeman, 1972). Indeed Tiedeman and O’Hara (1963), after delineating the stages (they called them steps), stated: “Obviously, the steps of crystallization, choice and clarification.
although analytically distinctive, are relatively inseparable” (p. 43). As a part of Tiedeman’s later attempts to create computer-assisted guidance programs, the four preentry stages were reduced to two “states” called Exploration and Clarification (Tiedeman, 1972). Harren’s recent factor analytic findings (Harren, 1979a) and theoretical statements (Harren, 1979b) regarding college students reduced the Tiedeman–O’Hara stages to two (called Planning and Commitment). However, as remarked above, two factors will exactly account for the correlations among any number of stages. Therefore simple factor analyses will not settle the question: How many stages? Before the four-stage model is abandoned for other reasons, the stage discreteness issue deserves an empirical test. The examination of competing models on carefully selected cross-section samples would seem to be a good starting point.

The stage dominance results may be explained, in part, by instrument limitations. The lack of clear-cut scale dominance may be due to problems with low reliability, abbreviated scale length, and content overlap for some scales. The α coefficients for the Crystallization and Clarification stage scales were consistently low. Low reliability of stage scales reduced the reliability of the scale difference scores used to test the dominance hypothesis. Since all stage measures had relatively few items, test-taking mistakes such as incorrect marking or skipping items could affect scores substantially. Casual examination of the Clarification Stage (4) and the Crystallization Stage (2) items revealed some content similarity. For example, a VDMC Crystallization scale item was “There are several careers which I have already decided against” and a Clarification scale item was “I think I am ready to select one occupation among the ones I have considered.” Content overlap increases the likelihood of flat score profiles thus mitigating against a stage dominance finding.

This study’s findings can point the way for future theory building and research. First, the Tiedeman–O’Hara stages should be explicated in greater detail using the results from this study and from Harren’s research (Harren, 1979a; Harren, Kass, Tinsley, & Moreland, 1978). The “primitive terms” of the 1963 paradigm must be converted to an explicit theoretical statement if the paradigm is to be useful in advancing “a science of career development.” Second, the stage definitions should be translated into refined stage measures. Distinctions between stages have already been shown, e.g., current Exploration and Choice scales showed consistently high negative correlations for the two samples (r = −.69 and −.40, respectively) and were the first and last stages to unfold. The refined scales should be of sufficient length to allow for satisfactory scale reliabilities. Item content should be as clearly identified with one theoretical stage as vocabulary limitations permit. Finally, these measures should be used in empirical tests of stage discreteness and stage onset and duration.
REFERENCES

Harren, V. A. Research with the Assessment of Career Decision Making. *Character Potential,* 1979, 9, 63–69. (a)
Harren, V. A. Model of career decision making for college students. *Journal of Vocational Behavior,* 1979, 14, 119–133. (b)

REFERENCE NOTES


Received: April 22, 1980.
stage represents a change in the dominant condition of the decision processes, i.e., a qualitatively different psychological state appears for each decision-making stage. The present study is an empirical test of whether measures of the Tiedeman–O’Hara stages reveal the order and dominance that the paradigm suggests.

Stage is the construct of special interest in this study. Tiedeman and O’Hara applied stage to the structure of decision processes rather than to modal behaviors or societal norms, as it is used in other career development theories (Critics, 1969). Indeed, Tiedeman and O’Hara appear to approximate more closely the special use of stage in cognitive-developmental theories than do other theorists (Jepsen, 1974).

Their paradigm was based on implicit or explicit assumptions about stages including the following:

1. The stages represent discontinuities in psychological states of a person in the process of acting upon the elements of a vocational problem.
2. Each stage represents a dominant psychological state and thus is distinct; however, stage transitions are gradual not instantaneous.
3. The stages occur in a general order but they may not occur in the particular order of contiguous stages. Advance and retreat are possible at any stage but advance predominates.

Although we were unable to locate more detailed specifications of stages and transitions in the Tiedeman–O’Hara paradigm, O’Hara and Tiedeman did define stage for purposes of an empirical study of the substages in the Ginzberg, Ginsburg, Axelrad, and Herma (1951) theory of occupational choice. Stage was thought to connote “a time interval in which something is prevalent which is not prevalent at another time. Thus ‘period’ and ‘stage’ suggest discreteness, dominance, and irreversibility” (1959, p. 294). O’Hara and Tiedeman portrayed discreteness as a sharp rise or surge in intensity of a behavior pattern followed by quiescence. Dominance implied that one behavior pattern overrides all others. Finally, irreversibility implied that the measure of the underlying dimension was a nondecreasing function of age.

Stage irreversibility and ordering in the paradigm remain unclear. Critics (1969) pointed out that although they assumed that process measures would be a monotonic increasing function of age, O’Hara and Tiedeman portrayed the quiescence of a stage as a drop followed by a parallel line rather than a line of positive slope expected for an increasing function. Stage ordering also remains unclear since apparently some stage skipping and regression are expected. At the same time, the cumulative nature of experience is emphasized so that each stage would seem to be difficult to reexperience.

We have decided that the view of stages most congruent with the 1963 paradigm was to interpret each vocational decision-making stage as a nonmonotonic function of age. This interpretation allows for the quiesci-
ence following the surge, dominance, and occasional reversals. We infer that the stage order presented above is the optimal and modal, though not the universal, sequence in which people experience the stages. Figure 1 is a portrayal of our interpretation of Tiedeman and O’Hara’s conceptualization of vocational decision-making stages. It is similar to Davison, Robbins, and Swanson’s (1978) reinterpretation of stages in Kohlberg’s moral judgment theory. Note that discreteness is represented by the surge in importance of a condition followed by a brief reign as the dominant behavioral theme and then a falling off. Assuming that such a picture accurately represents the VDM stages, we can proceed to test empirically both the order and dominance of stages in the Tiedeman–O’Hara paradigm.

Vincent Harren’s work has contributed substantially to the paradigm by providing stage interpretations and translating the stages into assessment instruments. He asserted that stages are dominant. “At any one time, individuals are at one another of the seven stages” (Harren, Note 3, p. 3). With regard to order, he said that the process is ordinarily progressive through the seven stages but regression and recycling are likely.

Harren constructed Q-sort and checklist instruments to assess vocational decision-making processes based on Tiedeman and O’Hara’s paradigm. The original Q-sort items (Harren, 1966) were converted to a checklist format. The Vocational Decision-Making Checklist (VDMC) (Harren, Note 1) assessed each stage with seven items selected by judges as representing thoughts or feelings of college students consistent with theoretical descriptions. Harren revised and expanded the VDMC into the Assessment of Career Decision-Making (ACDM) (Harren, Note 2). New items were constructed, tested on a college sample, and added to the original VDMC items. Form D of the ACDM included 10 items per stage.

Harren’s research has supported three theoretically relevant conclu-

![Fig. 1. Reconceptualization of Tiedeman and O’Hara’s Vocational Decision-Making Stages.](image-url)
sions about VDM stages among college students: (1) at least four stages were shown to exist and to be discrete factorially among males (Harren, 1966); (2) younger students score highest in the Exploration Stage whereas older students score highest in Choice stage (Harren, Note 2; Harren, 1979a); and (3) Stage scores are moderately negatively correlated or uncorrelated with each other (Harren, Note 2). A recent factor analytic study has suggested that the four stages can be reduced to two: Exploration/Crystallization and Choice/Clarification (Harren, 1979a). However, Ross and Cliff (1964) showed that two factors will always account for correlations among ordered stage variables.

There were two general purposes to this research: the first was to test stage order and dominance deduced from Tiedeman and O'Hara's paradigm. Responses to Harren's checklists were gathered from two high school student samples. Data were analyzed in order to test the hypotheses that (1) vocational decision-making stages are ordered as postulated in the Tiedeman–O'Hara paradigm: Exploration, Crystallization, Choice, and Clarification and (2) vocational decision-making stages are dominant, that is, students' responses are predominantly associated with a single stage.

The second purpose was to extend a metric unfolding model for testing a theory-predicted order of stages (Davison, 1977). One advantage of our extension, based on Jöreskog's (1970) method of analysis of covariance structures, is that it allows statistical tests of the model's goodness of fit. As a check on the new model and as a replication of the hypothesis tests, a more familiar nonmetric model for developmental stage data (Coombs, 1964; Kruskal, 1964) was applied to data from a second sample. The combination of the two methods and the two samples was expected to provide a stronger test of the stage order than either model alone on a single sample.

**METHODOLOGY**

A thorough examination of the research hypotheses required a complex methodology. Two subject samples, two instruments measuring VDM stages, and two unfolding models were utilized to test the stage order hypothesis. The stage dominance data involved one sample and one instrument and were tested against an a priori criterion.

**Sample 1.** Two hundred thirty-seven (237) 11th graders from one comprehensive 4-year high school serving a primarily suburban area adjacent to a medium-sized city completed the Decision Making Style and Occupational Choice sections of *Assessment of Career Decision-Making (ACDM)* (Harren, Note 2) in December, 1978. The ACDM was the fourth of several inventories administered as part of a larger study (Prediger, Note 6). The sample comprised 90% of the total class and included over 95% white Caucasians and about 52% were female. The class scored
above the national average on the Reading Total subscore of Iowa Tests of Educational Development.

Sample 2. Three hundred eleven (311) 9th and 11th graders from three comprehensive 4-year high schools serving predominantly rural areas completed the Occupational Choice section of the Vocational Decision-Making Checklist (VDMC) (Harren, Note 1) in the spring of 1976 as a part of a study of career decision processes. Almost all the students in the sample were white Caucasians and about 58% were female. School A served three small towns and the surrounding rural area. Schools B and C are located in larger towns of about 2500 population containing some light industry and several commercial establishments.

The first author or an assistant described the study to an entire class and invited students to participate. The 60% of the students who obtained written parental permissions were included in the study. Four career development inventories and a personal information form were administered during one class period on two consecutive days. The VDMC was the third instrument on the first day.

Instruments. Students in Sample 1 were administered the 40 Choice of Occupation items from the ACDM, Form D. Students in Sample 2 completed 28 Choice of Occupation items from the VDMC reworded to be appropriate for high school students. Instructions asked students to check all "statements you could say about yourself" and the number checked was the score for each vocational decision-making stage. Thus each student obtained four stage scores plus a classification by the stage where s/he had endorsed the most statements. In the case of ties, students were classified in the lower stage.

ACDM reliability was estimated for each stage by the Cronbach α measure of internal consistency. Alpha coefficients for 1118 college students were: Exploration, .82; Crystallization, .63; Choice, .82; and Clarification, .52 (Harren, Note 3). Prior to this study, Prediger (Note 6) reported ACDM α coefficients for Sample 1 as Exploration, .73; Crystallization, .52; Choice, .71; and Clarification, .32. Reliability data on the VDMC were difficult to obtain. Harren (1966) conducted test–retest reliability checks on the Q-sort version but results were not reported. No reliability data were reported in the VDMC Manual (Note 1). Therefore VDMC reliabilities were estimated for each stage by computing alpha for a random sample of half the 11th graders in Sample 2 (N = 71): Exploration, .62; Crystallization, .37; Choice, .62; and Clarification, .45.

Content validity for the four VDMC stage scales was established by submitting items to a panel of judges (Harren, 1966). Construct validity for the VDMC total score has been inferred from the theoretical research summarized earlier. In addition, the VDMC has been used in several studies as an outcome measure to evaluate the effectiveness of various vocational counseling procedures. Harren (Note 2) concluded that the
VDMC total score is sensitive to changes attributable to counseling. Since properties of the Harren instruments have not been clearly established for high school students, results of this study will be used to reexamine these issues.

Data analysis. Two methods were used to test the first hypothesis that stages are optimally ordered in the Tiedeman–O’Hara paradigm. Davison’s (1977) metric unfolding model and the nonmetric unfolding model of Coombs (1964) and Kruskal (1964). Both are based on a set of assumptions which will now be detailed. The data provided by a set of ACDM or VDMC item scores can be thought of as a set of stage scores. Four stage scores can be derived if one assumes that a person endorses more statements congruent with a stage as s/he gets closer to that stage. It is further assumed that a student endorses, on average, as many above-own-stage as below-own-stage items.

Coombs and Rao (1960) and Ross and Cliff (1964) derived a model for such developmental stage data. Ross and Cliff showed that, if stage scores are proportional to the squared distance between stage and person, two factors will exactly account for the correlations between stage measures. Davison (1977) extended this result for data with reliability less than 1, but only if all measures are equally reliable. The present authors show that these results can be extended to measurements of unequal reliabilities. It must be stressed that the reliability of the measures is therefore immaterial, if the model is correct.

In Jöreskog’s (1970) notation, we model the matrix of covariances among stage measures by the equation

\[ \Sigma = B(\Lambda \Lambda') B' + \Theta^2 \]

where \( \Sigma \) is the population covariance matrix, \( B \) is a diagonal matrix of true-score standard deviations of stage measures, \( \Lambda \) is the two-column matrix of factor loadings, and \( \Theta^2 \) is the diagonal matrix of the error variances.

Previous theoretical work concerned only the true-score part of the model. The value of the extension is that explicit account is taken of imperfectly reliable stage measures. Davison (1977) proved that the true-score part of our model gives a semicircular factor structure. That is, the plot of loadings of four stage measures on the two factors lie on a semicircle, if the model is correct. One way, then, to test the model is to fit all the parameters, calculate the deviations of the plot from semicircularity, and see if they are large. If maximum likelihood estimation of the parameters is used and the measures are normally distributed, then \(-2 \text{ const. \log } L\) is approximately distributed as \(X^2\), where \(L\) is the likelihood of the observations given the parameters. This gives an objective criterion of lack of fit.

Davison (1977) also pointed out regarding error-free data that, for three
stages in natural order \( x_i < x_j < x_k \), then the partial correlation of \( x_i \) with \( x_k \) controlling for \( x_j \) is \(-1\), that is, \( r_{ik \mid j} = -1 \). This important result leads to another test of the model’s fit: estimate each \( r_{ik \mid j}, i < j < k \), and compare it to \(-1\). Since our model allows one to estimate correlations of error-free true scores from fallible data, Davison’s equations for error-free data can be used with real data.

The second hypothesis was that vocational decision-making stages are dominant, that is, student responses are predominantly associated with a single stage rather than being distributed evenly over two or more stages. As implied in Fig. 1, only one stage, i.e., psychological state, exhibits the greatest intensity at most points in the VDM process. The exceptions occur at the transition points (the dashed vertical lines in Fig. 1). Dominance is demonstrated when scores for the highest stage exceed the scores for all other stages. Thus the difference between the highest and next-highest stage scores represents the extent to which one stage is dominant. Since there was no known appropriate statistical distribution against which to compare the distribution of observed differences, no statistical tests were applied. Instead the VDMC data for all of sample 2 were judged against an a priori definition of dominance: A stage will be considered dominant when the score difference equals or exceeds 2 (approximately one standard deviation on the VDMC stage scales) for a majority of the subjects.

**RESULTS**

*Stage Order Hypothesis*

Data obtained from sample 1 were analyzed using the authors’ extension of Davison’s metric unfolding model. The correlation matrix for the four ACDM stage measures among the 232 subjects in sample 1 are given in Table 1 along with the results of the maximum likelihood factor analysis. It seems that the stage measures are \( \tau \)-equivalent. Therefore the quantities (true score variance/factor variance) were set equal, as required in the definition of \( \tau \)-equivalence for factorially complex measures (Lord & Novick, 1968). When the factor loadings for the four VDM stages are plotted (see Fig. 2), they are convex and roughly semicircular. It is interesting that the orders of stages 3 and 4 are reversed. This sort of reversal is not unheard of; Davison et al. (1978) found two of Kohlberg’s moral development stages just so reversed.

The estimated correlations of nonadjacent stages, controlling for intervening stages, were also examined. As stated above, Davison (1977) showed that these partial correlations should equal \(-1\) if based on error-free data. The relevant partial correlations among the four measures, if the true stage order is \( 1 < 2 < 4 < 3 \) are \( r_{12,3} = -1, r_{12,4} = -1, r_{13,4} = -1, \) and \( r_{23,4} = -1 \). Every one of the correlations is estimated on the present data to be \(-1.00\) (to two decimal places). This is clearly a finding strongly favoring the
## TABLE 1
Correlation Matrix, Recovered Factor Loadings, and Estimated Variances For ACDM Vocational Decision-Making Stage Scores, Sample 1—11th Graders (N = 232)

<table>
<thead>
<tr>
<th>Stage</th>
<th>M</th>
<th>SD</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
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<tr>
<td>Exploration</td>
<td>4.810</td>
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<tr>
<td>Crystallization</td>
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<td>1.917</td>
<td>.547</td>
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<td></td>
<td></td>
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<tr>
<td>Choice</td>
<td>6.358</td>
<td>2.355</td>
<td>- .687</td>
<td>-.472</td>
<td>1.000</td>
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<td>Clarification</td>
<td>5.797</td>
<td>1.708</td>
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<td>.192</td>
<td>.124</td>
<td>1.000</td>
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**Factor Loadings**

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<th>Sum of squared loadings</th>
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<td>Crystallization</td>
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**Estimated Variances**

<table>
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<th>Stage</th>
<th>True</th>
<th>Error</th>
<th>Estimated reliability</th>
</tr>
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<tbody>
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<tr>
<td>Crystallization</td>
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<td>Clarification</td>
<td>1.894</td>
<td>0.996</td>
<td>.655</td>
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</table>

*Note. X² goodness of fit (df = 2) = .015, p < .993.*

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**Fig. 2.** Maximum Likelihood Factor Analysis Solution For Four ACDM Vocational Decision-Making Stage Scores, Sample 1 (N = 232).
hypotheses that these stages do fall in the order 1 < 2 < 4 < 3, and that the present method accurately recovers much of the postulated structure.

It was considered that the good fit of the metric scaling results for testing stage order might be due to the fact that maximum likelihood factor analysis may yield different structures for a data set, all fitting about equally well. Therefore the analysis was reconducted on a portion of sample 2 using another, nonmetric scaling method. Results, since substantially identical to those for sample 1, are more briefly reported.

The underlying model of the nonmetric scaling method is that the rank of the “distance,” i.e., number of responses, of stages to subjects is a merely monotone function of the underlying correlational structure. Therefore the method uses only the ordinal properties of the stage measures.

The results of this analysis are given in Table 2 for an independent sample of 88 ninth graders from School B in sample 2. (Since the capacity of the program restricted sample size to fewer than 100, the largest intact class from sample 2 was selected.) Except that stages 2 and 4 have nearly coincided, the order of stages is identical to the preceding analysis. See Fig. 3. The stress (a measure of badness of fit) of the model is only .018, which is very low, indicating that the model fits exceedingly well.

A third test of the stage order hypothesis was the application of the metric unfolding model to Sample 2. This allowed for examining the generalizability of both stage order and the unfolding model to other samples and stage measures. VDMC scores from a random sample of half the 11th graders in Sample 2 (N = 72) were used. Results are reported in Table 3. Once again the metric unfolding model fits well. Stage order results are similar to those for the first two tests with one small exception. As can be observed from the plotted factor loadings in Fig. 4, stages 1 and 2 do not lie on a clear semicircle. This exception is not extreme and may be accounted for by sampling fluctuation.

Therefore, two conclusions can be drawn from these analyses: first, the stages seem properly to fall in the order 1, 2, 4, 3 and not 1, 2, 3, 4.