



**The *Innovate with C.A.R.E.*
Profile[®]
Research Report**

The Innovate with C.A.R.E. Research Report
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Development of the C.A.R.E. Model

The C.A.R.E. concept and the *Innovate with C.A.R.E. Profile*[®] were developed by Allen N. Fahden and Srinivasan Namakkal, who have conducted creativity seminars and trained corporate personnel on the innovation process for over two decades.

After more than ten years of observing and researching teams that develop innovative services and products, Fahden and Namakkal discovered that each team member demonstrates a preference for performing certain roles over others. Their preferred roles reflect the way they think, and the way they behave in terms of change.

They also identified roles people perform in the innovation process. People who are comfortable in each of these roles tend to share distinct patterns of thinking and change-related behavior. Fahden and Namakkal call these patterns the primary Dimensions of Innovation: Creator, Advancer, Refiner, and Executor (C.A.R.E.).

Inscape Publishing conducted extensive research with hundreds of individuals, which led to the identification of four approaches to thinking and behaving. When graphed, this model creates a grid that illustrates the four Dimensions of Innovation and different combinations of these dimensions, which make up the C.A.R.E. Innovation Profile Patterns. The Patterns reflect the complex mixture of thinking and behavioral change tendencies found in the general adult population. They also demonstrate the diverse ways in which team members interrelate and benefit from each other's strengths in the innovation process.

Validity Research

The concepts measured by the *Innovate with C.A.R.E. Profile* have been identified and refined through three avenues of research:

Item Development

- **Behavioral Observation.** Authors Fahden and Namakkal analyzed their observations of group process and identified four primary roles that members play in the course of identifying and following up on creative ideas. Interviews with 500 individuals provided further insight into the characteristics of people who perform one of these four primary roles more often than not. On this basis, four scales were defined and placed in a theoretical model for measuring contributions to the creative process in groups.

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- **Review of Literature.** Published literature on the creative process and characteristics of more and less creative people were also reviewed. Collectively, the research confirmed the model developed by Fahden and Namakkal, while it added further insights into features that needed to be included in measuring related concepts.
 - **Psychometric Analysis.** Several stages of item development and refinement were undertaken to meet standards for scale reliability and validity and demonstrate quantitatively that the model is sound.
 1. A pool of items was written to measure various kinds of thinking and behavior that contribute to the creative process. These reflected both the observations of authors Fahden and Namakkal and the content of published research.
 2. Two groups of under 200 individuals each completed a rank-order response form to examine the structure of the item set. Both Factor Analysis and scale reliability coefficients (Cronbach's alpha) were computed on ranked scores. Factor Analytic results was only exploratory in this case, because the items were obtained on a ranked rather than an equal interval scale and the linearity of item responses was unknown.
 3. Factor Analysis proved useful in identifying four groups of items that measured a four-factor model. This analysis, following administration of a draft instrument to the first group, was used to refine the instrument before administration to the second group.
 4. Results obtained from a second sample of respondents yielded reliabilities of .80, .90, .76, and .59, with acceptable inter-scale correlations. Changes on the last two scales were made once more, to improve reliability coefficients.
 5. A final instrument containing four scales of twelve items each was administered to a sample of 686 individuals. Remaining analyses are based on results from this group.

Reliability and Validity

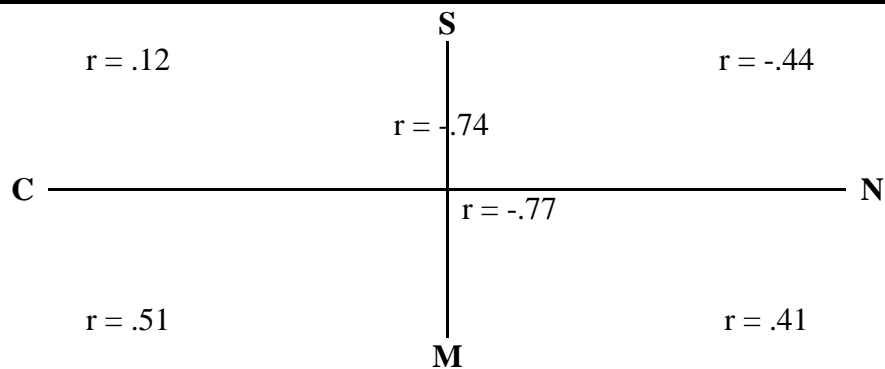
The reliability coefficients, in figure 1, were obtained from a sample of 686 respondents; they represent Cronbach's *alpha* coefficients correlated with the Spearman-Brown formula. There was little change in the coefficient when items were standardized. This outcome, together with other item statistics, indicate that item responses were rather normally distributed on each scale.

Figure 1

<u>SCALE</u>	<u>r_{xx'}</u>
Spontaneous	.86
Conceptual	.90
Methodical	.86
Normative	.84

Psychometrically, evidence for validity is obtained in several ways. One is to see if the correlations *between* scales are lower than the item correlations *within* scales (reliabilities). This measure indicates whether items are doing a better job of measuring the construct represented by the scale than they are measuring another scale's construct. When scale intercorrelations are compared, the results in figure 2 are obtained. These are presented configurally to show which scales are considered "opposites" and which are considered to be somewhat related in the model (at right angles to each other).

Figure 2



All of the coefficients of correlation between scales at right angles to each other in the model are appreciably lower than the alpha reliabilities of their associated scales. The intercorrelations between scales opposite to each other are -.74 and -.77, indicating that these scales are measuring concepts that are somewhat mutually exclusive.

A second important way to examine the validity of the model is to run a configural analysis on the relation of all items to each other. A multidimensional scaling program was used for this purpose, and solutions were obtained in two and three dimensions.

The three-dimensional solution provided a better fit (Stress = .125, RSQ = .89). However, the third dimension was defined by only seven items with a vector longer than 1.0, and it could not be interpreted. The two dimensional outcome (Stress = .18, RSQ = .83) offered a highly satisfactory solution in terms of the clarity of the array. With few exceptions, items for individual scales formed neat, segregated clusters and were arrayed in positions represented by the model.

Scale Interpretations

Scale score interpretations presented in the *Innovate with C.A.R.E. Profile*[®] were developed by combining psychometric findings with observations made by the authors. Initial interpretations were drafted by examining item content for each scale and relating it to what was learned in the review of literature. These were refined by the authors based on their observations of working teams.

Response Scaling

Item distributions from a sample of 815 respondents were examined to determine the levels at which scale scores indicate a preference for one scale or another. Score distributions were normalized, where necessary, and the median was selected as the cutoff for determining whether a score has practical significance. Scores are distributed somewhat differently on each scale, to reflect response patterns observed in the research sample.

The most important measure of a scale's relative importance in an individual profile is, however, the amount of area covered within each quadrant when the profile is plotted. By this approach, the error of measurement associated with specific cutoffs is, for the most part, avoided; overall shape of the profile directs its interpretation.

Interpretation of Scores

Using scale score medians to identify predominant patterns of response, the respondent groups, in table 1, were identified. They suggest how often a particular pattern may appear in the population, depending on how representative the sample of respondents is from whom the data is calculated. (See demographic summary on pages 5 – 6.)

Table 1: Distribution of Response Patterns (N=815 respondents)

One Predominant Pattern	Total N=522 (64%)
<i>Creator</i>	N=212 (26%)
<i>Advancer</i>	N=41 (5%)
<i>Advancer Axis</i>	N=9 (1%)
<i>Refiner</i>	N=82 (10%)
<i>Refiner Axis</i>	N=8 (1%)
<i>Executor</i>	N=139 (17%)
<i>Facilitator</i>	N=33 (4%)
Combination Patterns	Total N=293 (36%)
<i>Creator/Advancer</i>	N=57 (7%)
<i>Advancer/Executor</i>	N=65 (8%)
<i>Refiner/Executor</i>	N=64 (8%)
<i>Creator/Refiner</i>	N=105 (13%)

A final analysis of score distributions was obtained via subject cluster analysis. Since the model identifies nine patterns—e.g., four “pure” patterns (Creator, Advancer, Refiner, and Executor), four combination patterns of two Dimensions (Creator/Advancer, Advancer/Executor, Refiner/Executor, and Creator/Refiner), and a Facilitator pattern—it was useful to examine what combination of scores would describe nine groups of subjects when they were formed quantitatively through the method of cluster analysis.

The results, in figure 3, were obtained (N = 880), using median scores as the cutoff for assigning a cluster to a pattern:

Figure 3

Cluster:	1. Creator	N=228 (26%)
	2. Creator/Advancer	N=72 (8%)
	3. Advancer	N=55 (6%)
	4. Advancer/Executor	N=54 (6%)
	5. Refiner	N=150 (17%)
	6. Creator/Refiner	N=90 (10%)
	7. Executor	N=137 (16%)
	8. Refiner/Executor	N=84 (10%)
	9. Facilitator	N=10 (1%)

The shape of each group’s profile does not match exactly the nine patterns discussed in the profile. Pure patterns are included with combination patterns within one or more clusters. However, this evidence offers meaningful support for the existence of different patterns, as hypothesized, among people for whom the instrument is intended.

Demographic Characteristics of the Major Research Sample

Research findings reported above were obtained from 686 participants who completed the final version of the *Innovate with C.A.R.E.*® Profile using new items in a rank order format, and an additional 179 responses obtained in 1996. The characteristics of the original sample of 686 are shown in the following summary.

- **Age:** Median age was 39, but the highest represented age category was aged 40-49 (32%).
- **Education:** 68% of the group had a college degree or higher.
- **Occupation:** 55% of the group were in supervisory, management or professional positions. The other half were distributed among Secretarial/Clerical (13%), Sales (9%), Mechanical/Technical (6%), Labor (5.4%) and Other (8%) occupations.

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- **Geographical Region:** 86% of the sample was drawn from the central region of the United States. Most of the remaining participants were from the Northeast at 12%.
 - **Heritage:** 86% of the sample identified themselves as Caucasian. Thus, 14% were from minority groups, with African Americans contributing 8% of the total sample.
 - **Industry:** Industries represented in this sample were, in order, “unclassified” (32%), Transportation/Communications (19%), Wholesale/Retail (16%), Educational Services (11%), Business Services (8%), Finance/Insurance (6%), Manufacturing (4%), Health Services (3%), Public Administration (1%), Utilities (1%).
 - **Gender:** The sample was comprised of 47% male and 53% female participants.

Characteristics by Profile Pattern

When Creator, Advancer, Refiner, and Executor patterns were examined for differences in demographic categories, the following findings were obtained. Comparisons were confined to those with a clear preference for one role or another and did not include people with combination patterns.

- **Gender:** Men and women were proportionately represented among Creators, Refiners, and Executors. In this sample, Advancers were disproportionately female.
- **Age:** Two observations can be made about comparisons by age. Advancers were disproportionately young; however, this factor is confounded by gender (female participants were younger) and occupation (Advancers were disproportionately found in sales, clerical and professional positions).

The relative proportion of Creators increased with age and the relative proportion of Advancers decreased. Refiners and Executors were more evenly distributed across age groups.

- **Education:** Creators appeared more frequently as education increased. No clear relationships existed for the other three patterns.
- **Occupation:** Creators appeared most frequently in management positions than any other pattern. Creators and Refiners dominated in the professional group, Advancers appeared most frequently in the sales and clerical groups, and the Executor pattern appeared as often as all other patterns combined among laborers. The Executor pattern appeared most frequently among supervisors and technicians, as well. Executives were either Creators or Refiners; and few or none were Advancers or Executors.

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- **Industry:** Refiners tended to dominate in finance, insurance, and educational services. Advancers and Executors were predominantly in wholesale/retail businesses. In other fields, no clear pattern emerged.
 - **Heritage:** No meaningful differences were observed by race/ethnic origin. However, sample sizes among minority groups were small.
 - **Geography:** No meaningful differences were observed.

Some of the above differences are statistically significant and some describe trends in the data that provide a useful background for understanding how certain patterns may emerge more or less frequently in population subgroups. Differences in scale scores between demographic subgroups are most likely reflective of actual differences between the groups, in the roles they prefer, than a consequence of bias in measurement. As differential results for protected classes may be obtained, this instrument is inappropriate for use in a selection context.

Summary

The *Innovate with C.A.R.E. Profile*[®] has been developed and tested on a number of participants over the last several years. Careful examination of items and the model itself have produced a reliable instrument that differentiates four roles people play in an innovative process. This measure is found to differentiate in meaningful ways among people individually and in groups, and to fulfill the theoretical expectations of the model.