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STRUCTURED CONCEPTUALIZATION

A Framework for Interpreting Evaluation Results

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ABSTRACT

The structured conceptualization method can be used as a descriptive and interpretive tool for understanding results from evaluations and applied social research programs. A case study of women in Fordham University's EXCEL reentry program for adults demonstrates the use of this method in the descriptive and exploratory phase of research. Two groups of women were identified and contrasted on the California Q-set which contains 100 personality descriptors. ANCOVAs revealed few statistically significant differences between Integrators, women with focused career goals, and Seekers, women with unfocused career goals. However, when differences between Integrators and Seekers on each of 100 personality items are overlaid on a map of these items which was generated by the combined use of multidimensional scaling and cluster analysis procedures, a pattern is observed which is readily interpretable and indicates that these two groups are not homogeneous. Similarly, women who completed their first year of college were contrasted on all 100 personality items with women who did not complete their first year of study. The method of structured conceptualization is viewed as useful in helping evaluators make sensible inferences from findings even when statistically significant differences are not evident because of low statistical power due to small sample sizes or inadequate measures. Further, the method can serve as a tool for examining and strengthening statistical conclusion validity when multiple significance tests are used.

Structured conceptualization is an innovative research method developed in part to enhance "pattern matching" of conceptual and operational domains in the field of program evaluation (Trochim, in press). The emphasis in this paper will be on the use of the structured conceptualization method as a descriptive and interpretive tool for understanding the results from evaluation studies and applied social research programs. Here, concept maps are used in a pattern matching perspective by overlaying estimates of differences between defined groups onto a concept map of personality characteristics. The maps generated by the structured conceptualization procedure offer a graphic representation of the obtained pattern of results and serve as a framework for the display of statistical data. This paper discusses the potential use of such maps for helping us discern meaningful inferences from our data even when univariate statistical tests do not reach statistical significance.

In order to demonstrate the utility of the conceptualization method an analysis of a portion of data obtained from the first wave of a mixed-methods longitudinal study will be presented. The study was set within an ecological framework (Bronfenbrenner, 1979) and examined the experience of women reentering the educational system during the initial period of adjustment from the time just prior to college entrance to the end of their first academic year. By their nature role transitions pose potential challenges since they disrupt established patterns of behavior and require personal adjustment (George, 1980; Jacobi, 1987). Therefore, an

I would like to thank Bill Trochim for sharing his expertise as mentor and collaborator in the analysis presented. My gratitude is also extended to Stephen Hamilton and Daryl Bem who have been mainstays in all aspects of this research project.

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inquiry was made to determine what psychological changes, if any, occurred in the lives of women who were making this transition as adults. Another purpose of this study was to provide teachers, counselors, and administrators in higher education with a description of the personal characteristics of women who differed along motivational dimensions and expectations in beginning or returning to college. It was anticipated that women who differed in orientation might respond differently to the college experience.

METHOD

Sample

All participants were enrolled in Fordham University's EXCEL program. The EXCEL program is a "special entry program for adults, leading to a B.A. degree." The establishment of this program in 1970, with its interdisciplinary focus and credit for life experience, represented a major effort on the part of the University to adapt their traditional liberal arts programs to the needs of adult students by providing a bridge-program to college.

The sample of 70 women is fairly representative of entering classes: mean age 34, 30% minority women, majority attending evening classes. Most of these women were in the labor force (77%) or intended to resume employment. Forty percent of the women lived with a spouse or mate and of these about one-third had children at home. Single mothers with children at home were approximately 16% of the sample. The remaining women were independent (without mate or children).

Design

A pre and posttest academic year longitudinal design was used to document the early transition experience of adult women entering or returning to college. Interviews were conducted with participants prior to college entrance and at the end of their first year. A number of paper and pencil measures were also given. This paper will focus on one of the instruments, the California Q-set, which was given to participants at both points of data collection in order to obtain a broad range of personality characteristics and to serve as a means of describing subgroups within the sample. (See Caracelli, 1988 for a more complete description of the methods and results of this study.)

Measures

All participants completed the California Q-set which is a standardized personality measure that has been used extensively in psychological research (Bem & Funder, 1978; Block, 1961). The Q-set contains 100 descriptive personality statements (e.g. critical, skeptical, has insight into own motives and behavior, etc.). In this procedure the universe of items is essentially predefined for participants. Using a forced symmetric distribution each woman sorts the cards into 9 categories ranging from 1 (those items that are least characteristic) to 9 (those items that are most characteristic of her personality). Thus each item receives a score from 1 to 9; the distribution has a mean of 5 and a standard deviation of 2.

Development of the Conceptual Map

There were three steps involved in the development of the conceptual map. First, an individual multidimensional scaling (MDS) analysis (Davison, 1983; Kruskal & Wish, 1978) was conducted using the INDSCAL model. A two-dimensional solution was selected primarily for the ease of interpretation and comprehension it affords. Kruskal & Wish concur that a two-dimensional configuration is more useful than a configuration of 3 or more dimensions when MDS serves as a foundation to display clustering results as is done here. Essentially the MDS procedure scales the 100 items in relation to one another based on the item rating similarities. The output is a two-dimensional snapshot of the conceptual arrangement of all 100 items. More specifically, it is a spatial, map-like representation consisting of a geometric configuration of all 100 points. Second, Ward's hierarchical cluster analysis procedure was used to group the items into conceptual domains of personality. The decision to depict a four cluster solution was again based on ease of interpretation. Cluster names were finalized through a process of consensual agreement among several social science researchers. Table 1 lists the Q-items contained within each of the following four clusters: Affiliative-Intellectual; Extraversion-Sociability; Adaptive-Maladaptive; Self-Assurance. Third, subgroups were identified and differences between these groups on each of the 100 items were examined using an analysis of covariance (ANCOVA) model. These analyses tested for differences between groups on each item at the end of their first year of college, controlling for pretest differences for that item. Bar graphs representing the t-values obtained in these analyses were superimposed on the map for each of the 100 items. Those bars containing five units were significant at the .05 level.

The first subgroup analysis made a distinction between women in the sample on the basis of their career goals. Two types of reentry women were identified through a qualitative analysis of the interview transcripts (see Patton, 1980 regarding analyst-constructed typologies). One group, women with focused career goals were classified as Integrators. Generally these women had specific professional goals (e.g., becoming

TABLE 1
Q-ITEMS BY CLUSTER

Self Assurance
- Q1. Critical, skeptical
- Q16. Introspective
- Q31. Regards self as attractive
- Q39. Unusual, unconventional thinking
- Q52. Assertive
- Q57. Interesting, arresting
- Q62. Rebellious, non-conforming
- Q69. Sensitive to demands
- Q71. High aspiration level
- Q74. Self-satisfied
- Q77. Appears straightforward, candid
- Q81. Physically attractive
- Q82. Fluctuating moods
- Q83. Sees to heart of important problems
- Q90. Concerned with philosophical problems
- Q91. Power oriented; values power
- Q92. Social poise
- Q98. Verbally fluent

Affiliative-Intellectual
- Q2. Dependable, responsible
- Q3. Wide range of interests
- Q4. Talkative
- Q5. Giving toward others
- Q8. Intelligent
- Q11. Protective of those close to her
- Q15. Skilled in imaginative play, humor
- Q17. Sympathetic, considerate
- Q18. Initiates humor
- Q20. Rapid personal tempo
- Q24. Prides self on being objective, rational
- Q26. Productive
- Q28. Arouses liking, acceptance
- Q29. Turned to for advice, reassurance
- Q35. Warm, capacity for close relationships
- Q43. Facially/gesturally expressive
- Q51. Values intellectual & cognitive matters
- Q56. Responds to humor
- Q58. Enjoys sensuous experiences
- Q60. Has insight into own motives & behavior
- Q66. Aesthetically reactive
- Q70. Ethically consistent
- Q84. Cheerful

Extraversion-Sociability
- Q7. Conservative values
- Q10. Anxiety finds outlet in bodily symptoms
- Q19. Seeks reassurance
- Q21. Arouses nurturance
- Q32. Aware of impression she makes
- Q33. Calm, relaxed
- Q44. Evaluates motivation of others
- Q46. Daydreams, fantasizes
- Q54. Gregarious
- Q59. Concerned with bodily functioning
- Q64. Socially perceptive
- Q72. Concerned with own adequacy
- Q75. Consistent, clear-cut personality
- Q79. Ruminates, pre-occupying thoughts
- Q80. Interested in opposite sex
- Q85. Emphasizes action, non-verbal behavior
- Q88. Personally charming
- Q89. Compares self to others
- Q93. Feminine
- Q95. Offers advice
- Q96. Values independence, autonomy

Adaptive-Maladaptive
- Q6. Fastidious
- Q9. Uncomfortable with uncertainty, complexity
- Q12. Self-defensive
- Q13. Thin skinned
- Q14. Submissive
- Q22. Feels lack of personal meaning
- Q23. Extrapunitive, projects blame
- Q25. Over-controlled
- Q27. Condescending
- Q30. Gives up in the face of frustration
- Q34. Over-reactive to frustration, irritable
- Q36. Negativistic; obstructs, sabotages
- Q37. Guileful, manipulative, opportunistic
- Q38. Has hostility
- Q40. Vulnerable to threat, fearful
- Q41. Moralistic
- Q42. Delays or avoids action
- Q45. Brittle ego-defenses
- Q47. Feels guilty readily
- Q48. Keeps people at a distance
- Q49. Basically distrustful of others
- Q50. Unpredictable, changeable
- Q53. Unable to delay gratification, uncontrolled
- Q55. Self-defeating
- Q61. Creates and exploits dependency
- Q63. Judges self/others in conventional terms
- Q65. Stretches limits
- Q67. Self-indulgent
- Q68. Basically anxious
- Q73. Eroticizes situations
- Q76. Projects feelings/motivations onto others
- Q78. Feels cheated/victimized; self-pitying
- Q86. Repressive
- Q87. Complicates situations
- Q94. Expresses hostility directly
- Q97. Emotionally bland; flat affect
- Q99. Self-dramatizing; histrionic
- Q100. Does not vary roles

a lawyer or child psychologist) and viewed college as providing a means to those ends. The other group, women with unfocused career goals, were classified as Seekers. These women were concerned about career issues but were less directed and not committed to specific career goals. For the most part, they expressed feelings of being "in a waiting period," "marking time," "trying to leave things open." They viewed college as a tool of exploration.

The second subgroup analysis distinguished women

in the sample in terms of their persistence in pursuing their college education. The relatively few ($n = 7$) women who withdrew from the EXCEL program before the end of the first year were classified as Nonpersisters while those who completed their first year were identified as Persisters.

RESULTS

One purpose of this research was to provide a description of these reentry women on the basis of personality characteristics. Figure 1 shows the concept map for the 100 Q-set items. In general, items which are closer together on the map had similar ratings while those which are farther apart had more discrepant ones. We can begin a rudimentary interpretation of the personality items using Figure 2 which combines the results of the MDS and cluster analysis procedures. This figure is essentially a graphic portrayal of the cluster results reported in Table 1. When we examine the results for each item, we find that the items rated as "most" or "quite" characteristic by women in the sample ($n = 50$) tend to be located on the left side of the map. In fact 85% of these items are in the Affiliative-Intellectual cluster. This finding is somewhat surprising given that the sex-differences literature often separates characteristics in this cluster into two separate and opposing constructs. It is clear that these reentry women feel they have a mix of traits associated with these theoretically separate constructs (see Emmerich, 1973 and Gilligan, 1982 for thoughtful appraisals of the research surrounding this issue). Overall, women in the sample are describing themselves as dependable, responsible, and productive. On a cognitive level they perceive themselves as intelligent, valuing intellectual and cognitive matters, having a wide range of interests, high aspiration level, and as aesthetically reactive. On an interpersonal level they feel they respond to humor, are warm, sensuous, and considerate of others.

On the right side of the map are the Q-items that these women rated as "least characteristic" or "quite uncharacteristic" of themselves. Almost all of these items are in the Adaptive-Maladaptive cluster. In general, women in the sample do not perceive themselves as deceitful, manipulative, or as creating and exploiting dependency in others. In response to life's vicissitudes they do not feel they are emotionally bland or self-pitying. Nor do they see themselves as giving up or withdrawing in the face of frustration or adversity. It appears the women strike a balance in valuing interpersonal and instrumental aspects of their lives and reveal their own perceptions of inner strength in meeting challenges such as the one posed by their recent transition to college.

Subgroup Analysis: Integrators versus Seekers

It was anticipated that some psychological changes might occur for women making a transition of this nature as adults, and further that women who held different motivations and expectations when returning to college might respond differently to the college experi-

Figure 1. Two-dimensional concept map showing the 100 Q-set items.

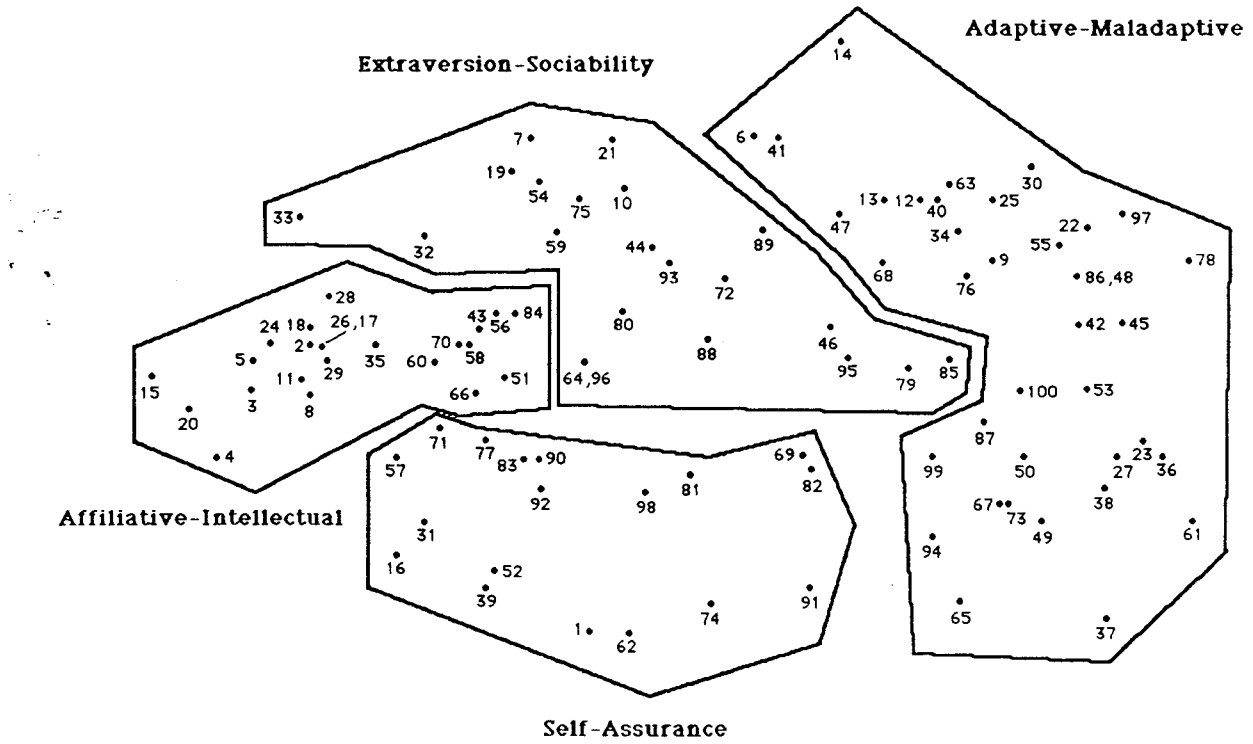

Figure 2. Two-dimensional concept map showing individual Q-set items, clusters, and cluster names.

ence. Figure 3 depicts the results of the ANCOVAs that compare the personality characteristics of these women at the end of their first year of college.

Only women who retained the same classification for pre and posttest are included in this analysis (Integrators $n = 19$, Seekers $n = 22$). Higher bars on the graph indicate higher estimates of group differences (i.e., t-values) for that Q-item while the shading of the bars indicates which of the two groups scored higher in mean value. Often we are constrained in reporting results of studies to emphasize only the findings that are statistically significant. That being the case there would be little to say about these two groups of women since significant differences were few in number.

What do we gain by having a conceptual map as a framework for reporting our findings? In Figure 3 we can readily detect a pattern across the four clusters. The clusters on the left side of the map show a preponderance of dark columns. The ANCOVAs reveal that by the end of their first year in college Integrators tended to score themselves higher than Seekers on these Q-items. Thus, the map clearly shows that Integrators rated themselves higher on almost all of the cognitive characteristics in the Affiliative-Intellectual cluster. These are characteristics we would expect to be important in a college environment, e.g., perceiving oneself as intelligent, valuing intellectual and cognitive matters, having a wide range of interests, and being skilled in imaginative play.

On the right side of the map we see that the reverse is true. The clusters show a preponderance of white columns indicating that Seekers tended to rate themselves higher on these Q-items. Again, the map clearly shows the Q-items that distinguish between the groups. In the Adaptive-Maladaptive cluster the t-values show that it is more characteristic of Seekers to perceive themselves as basically anxious and self-defeating. In comparison to Integrators they see themselves as more likely to delay action, be unpredictable, and to be concerned with their own adequacy.

A typical interpretation of these data would lead one to conclude that Integrators and Seekers do not differ since statistical differences between the groups using the ANCOVA model were not greater than we might expect by chance. In this example, even a multivariate ANCOVA would be likely to yield a nonsignificant overall F-value. Nevertheless, by overlaying these results on a mapping background it is reasonable to conclude that the overall pattern suggests an interpretable finding regarding how Integrators and Seekers may differ. The conceptual map effectively enables us to draw portraits of the two groups of women. We can place greater confidence in the characteristics that statistically distinguished Integrators and Seekers (5 unit t-value bars) because the obtained pattern of differences supports these findings. Further, the pattern suggests we might erroneously conclude a lack of true difference between groups when actually low statistical power

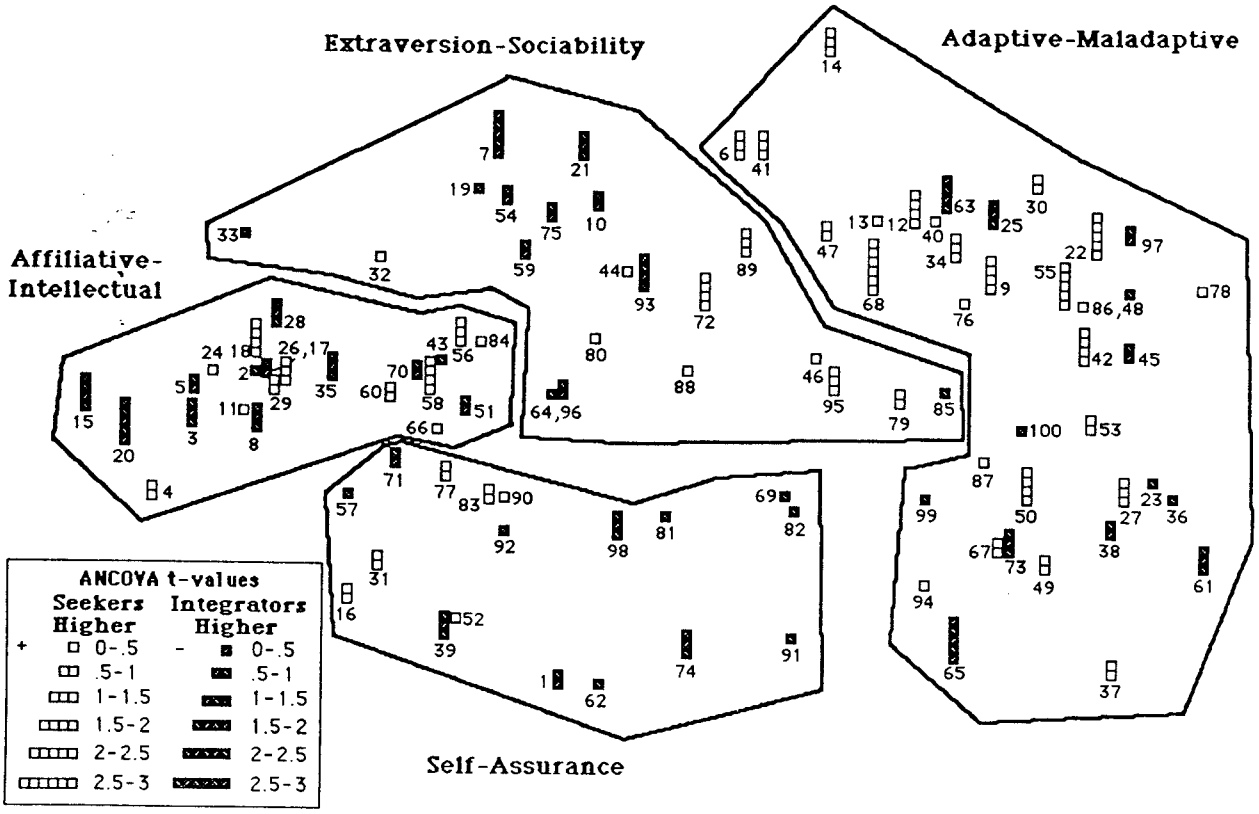

Figure 3. Concept map showing ANCOVA *t*-value results testing for differences between Integrators and Seekers.

may have influenced the outcome of the analyses of covariance.

Subgroup Analysis: Persisters versus Nonpersisters

An even clearer illustration of this line of argument can be demonstrated with the concept map in Figure 4 where the distinction between groups is even more striking. Higher *t*-values are clearly predominant for Persisters in the Self-Assurance cluster, especially for item 71 which relates to high aspiration level. Persisters also rate themselves more highly on the cognitive traits contained in the Affiliative-Intellectual cluster. In the Adaptive-Maladaptive cluster the *t*-values indicate that in contrast to Persisters it is more characteristic of the Nonpersisters to perceive themselves as submissive, self-indulgent, unable to delay gratification, and giving up and withdrawing in the face of frustration. Again, it is important to note that the statistical significance of individual Q-items, where it occurs, is greatly supported by the pattern of differences between groups that is apparent in Figure 4.

Persistence is a complex phenomenon of interest to counselors and educational administrators. These results must be viewed in the context of the overall study. The ostensible reasons given by these women for withdrawing from the program revealed concerns about finances, job transitions, and family issues. Nonpersisters enter college with lower aptitude scores and the personality profiles we derive from the conceptual map indicate that compared to persisters these women reveal less academic motivation and a general mode of responding to adverse conditions that may warrant targeted intervention strategies on the part of college counseling services. In this instance, in conjunction with other findings, the conceptual map helps to broaden our understanding of the multifaceted issue of persistence.

CONCLUSIONS

At the outset of this paper the point was made that the structured conceptualization method could serve as a descriptive and interpretive tool for understanding results from evaluation studies, and further, that the conceptual maps generated by the multidimensional scaling and cluster analysis procedures could serve as a framework for the display of statistical data. There are several concluding points that need elaboration concerning the utility of this approach.

First, the first phase of the study that was presented

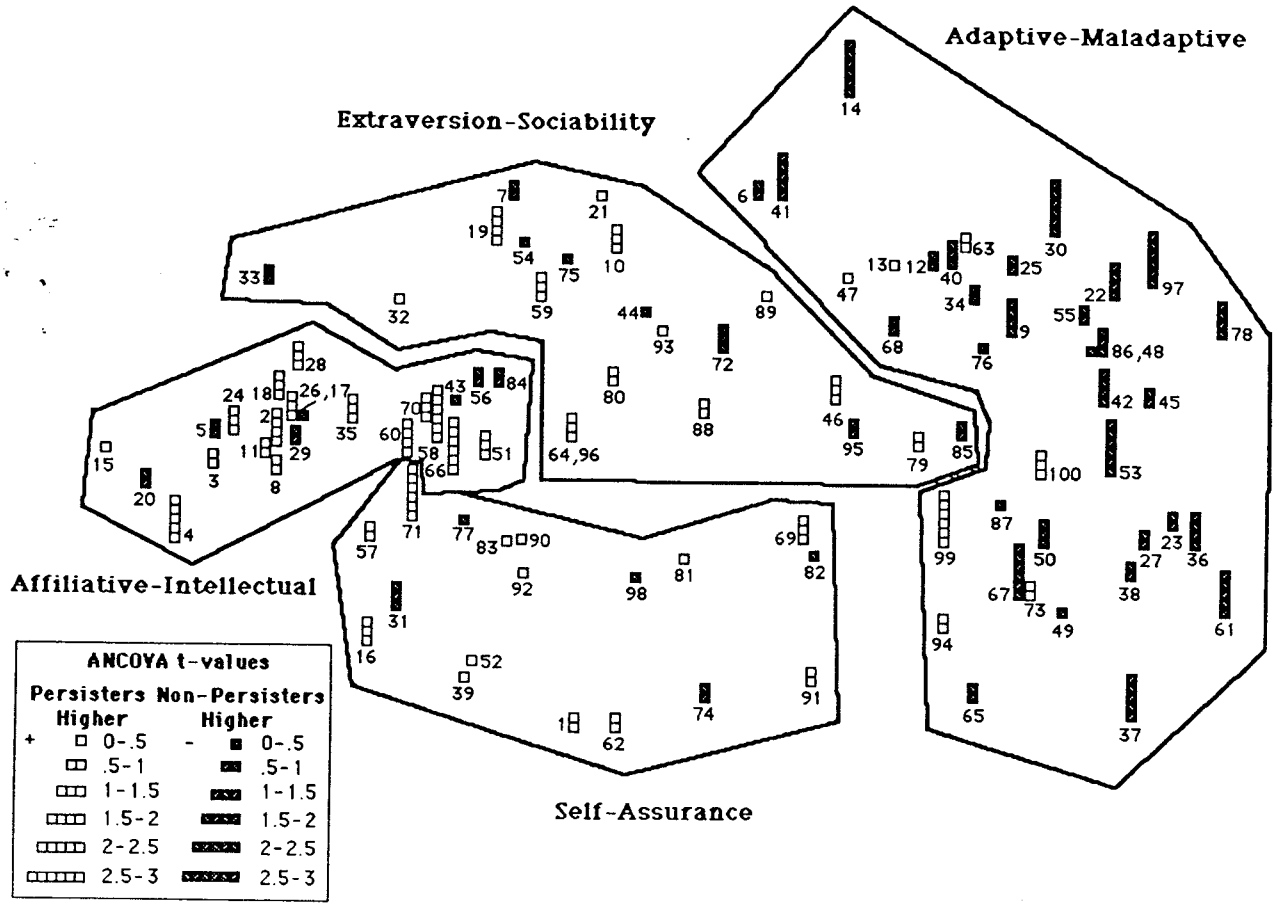

Figure 4. Concept map showing ANCOVA *t*-value results testing for differences between Persisters and Non-Persisters.

as an illustration was intended to be descriptive and exploratory and the conceptual maps were interpreted here with that purpose in mind. In studies designed on the basis of pre-existing theory, the structured conceptualization method can also serve as a tool of confirmation by using pattern matching techniques that contrast obtained patterns derived from empirical data with expected patterns based on theory (Trochim, in press; Trochim, 1985). The similarity or match between patterns determines the degree to which we can claim construct validity for the cause-effect relationship. In this study, for instance, it would have been interesting to generate a theoretical pattern (i.e., concept map) of the Q-items based on a panel's judgments of these items' conceptual similarity. Estimates of group differences could then be overlayed onto this theoretical measurement pattern.

Second, in evaluations where the sample size is small or where measures may not be adequate we may fail to find statistical differences simply due to low power. In this case we can look at the pattern of non-significant findings and make some determination of where we might expect to find differences if we had more power in our study to pick up those effects. We also need to keep in mind that differences do not have to be statistically significant to be meaningful and that even statistically significant results may lack practical significance.

Third, in evaluations requiring multiple significance tests we face the "fishing expedition" or "error rate" problem—that we are likely to suspect that some proportion of the individual tests are significant by chance alone. Mark and Cook (1984) outline several corrective statistical adjustments that can be made. They note, however, that despite precautions it is still possible to conclude that a treatment is related to an outcome when it is not (Type I error) or that a treatment and outcome are not related when in fact they are (Type II error). The structured conceptualization method can serve to examine the error rate problem graphically since we would expect that if obtained differences were due to "chance" they would be spread throughout the conceptual map in some random fashion. The map can serve as a line of defense against the "chance" argument since by visual inspection we can judge whether the differences between groups are random with respect to the interrelational structures of the

measures. We can do this by placing these significant differences in the context of the surrounding pattern of results.

In essence, the argument for the utility of the structured conceptualization method outlined here is analogous to the discovery of the Nazca lines in Peru. At ground level these lines on the desert plain of Nazca appear to be nothing more than furrows in the ground. When viewed from the air the lines form definite outlines of birds, animals, human and geometric figures traced by Pre-Incaic civilization. The maps illustrated in this paper provide such an aerial view. The display of statistical data in this fashion has the potential of elucidating patterns in our data that allow us to reduce the level of inferential equivocality and improve interpretation of our findings.

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Guest Editor

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