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NONTRADITIONAL RESEARCH

Concept Mapping Organizational Cultures

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Organizational culture has been a popular focus among organizational researchers for well over a decade (Deal & Kennedy, 1984; Schein, 1984, 1985), and although some of the earlier expectations of the culture construct have waned, there is still ongoing interest among researchers, practitioners, and managers about the cultures of organizations. In a recent book, Alvesson and Berg (1992) suggested that "few concepts have had such an impact on organizational and corporate management research in recent years as that of organizational culture" (p. 8). Despite, or because of, continued interest in the topic, there is ongoing debate around a number of fundamental issues such as how culture should be defined and conceptualized in an organizational context and what research methods are most appropriate for the study of culture. Perhaps the only agreement among cultural researchers is the elusive nature of culture and the inherent difficulties associated with trying to conduct research on cultural phenomena.

Given the sustained interest in organizational culture as a research topic coupled with the complex and often subtle nature of culture, we have endeavored to contribute a research technique that may help researchers, consultants, and others identify elements of organizational cultures. The technique we are demonstrating and reviewing in this article is known as concept mapping. Concept mapping is a conceptualization tool that may be used for articulating and identifying patterns within a cultural milieu. We provide one example of concept mapping applied to a multinational firm undergoing a change in corporate and cultural identity. Based on this example and others in the literature, we discuss some of the strengths, weaknesses, and possibilities for the methodology.

One of the important differences between an organizational culture perspective and other perspectives of organization theory is that many proponents of the cultural perspective do not believe that the more traditional quantitative, experimental and quasi-experimental, logical positivist approaches to research are particularly useful for studying organizations (Ott, 1989). It has been suggested that historically, "quantitative methods encouraged researchers to separate themselves from the phenomena that made up organizational life and spend limited time, if any, in organizations to collect their data" (Trice & Beyer, 1993, p. 31). As a result of the limitations of dominant paradigm research, "studies of organizational culture have relied almost exclusively on qualitative methods,

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such as ethnographic observation or in-depth, open-ended interviewing" (Siehl & Martin, 1988, p. 79). Qualitative research focuses on and emphasizes an emic orientation or approach to the study of the organization (viewing from within) rather than the etic approach whereby a detached researcher observes from outside the organization (Jones, Moore, & Snyder, 1988). According to Trice and Beyer (1993), the revival of qualitative methods and the interest in organizational culture reinforced each other "for qualitative methods almost invariably surface something of cultural significance and the accepted ways of doing cultural research involve qualitative methods" (p. 32).

However, Siehl and Martin (1988) pointed out that "advantages of qualitative approaches have been bought at a cost" (p. 80). A potential limitation of ethnographic studies of organizational culture is the volume of output that is generated from such research. To capture the essence of organizational culture, an enormous amount of data tends to be collected, especially if one considers subcultures, countercultures, ambiguities, and inconsistencies as part and parcel of the cultures of organizations, as Martin (1992) suggested. This mass of cultural data then forms the basis of a sizable narrative, which may have limited appeal or usefulness outside of the academic community. Furthermore, this type of output may be problematic for theoretical generalization.

As Alvesson and Berg (1992) noted, "an interesting aspect of organizational culture is that it has captured the interest of both the academic and the pragmatic extremes" (p. 34) within the management field, which is somewhat unique because academic rigor and applied solutions often have different audiences. If academic respectability and practical relevance are to continue within cultural research, then it is essential that data and findings are presented in a manner that is accessible and interpretable to both academic and nonacademic audiences.

Research Question

The question of interest in this study is whether concept mapping can contribute to understanding organizational cultures. In particular, can concept mapping complement ethnographic narrative by portraying conceptual data in a concise format? Previous research has shown that concept maps can be used to portray the richness and complexity of a broad range of phenomena. For example, this technique has been used for conceptualizing adventure-based training (Kolb, 1994), clarifying research agendas (Thomas & McDonald, 1994), and workplace evaluation (Trochim, Cook, & Setze, 1994). Exploring organizational culture using concept mapping offers a combination of an innovative research method applied to an important area of organizational study.

METHODOLOGY

Organizational Setting

AT&T Global Information Solutions (GIS), New Zealand, formerly NCR,[1] was the setting for this study. At the time of the study, AT&T GIS was one of four AT&T business groups with 30 development and manufacturing facilities around the world. The stated business objective of AT&T GIS was to "help businesses more efficiently GET, MOVE and USE information about their customers so they may better serve them" (1993 AT&T Annual Report, 1994, p. 13). The strategic implication of this objective, according to AT&T's 1993 annual report, was that "AT&T is the only information systems provider that can deliver each of the components of getting, moving and using customer information. The company's supermarket scanners, automated teller machines and notebook computers collect information. The company's voice and data networking systems and services move it. And the client/server and massive parallel processing systems turn customer information into knowledge."

Recent years had been a turbulent time for NCR, known to many as a stable, somewhat conservative but successful company. NCR was taken over by AT&T in 1991, and although there was a 2-year "hands off" period immediately following the takeover, NCR still experienced some changes such as restructuring and downsizing to remain competitive. In addition, the looming AT&T changes were always imminent. At the end of 1993, the name changed, and with it, a number of far-reaching changes were implemented to align the old NCR with the other AT&T business groups. In October 1993, the staff number in New Zealand was 264; 8 months later, the total number was 204. All staff members now work in multifunctional "customer-focused teams" and are expected to work by a set of five values known as Our Common Bond to adjust to an ever-changing technology environment and cope with the amalgamation of NCR to AT&T. The fact that the organization is facing significant changes, both internally and externally, offers an opportunity

for cultural issues to surface more easily. When things are running smoothly, it is unlikely that cultural issues would be challenged or questioned (Christensen, 1988). Louis (1985) suggested that organizational culture phenomena are more accessible at some times than at others and that disruptions (e.g., restructuring, change initiatives, and takeovers) bring to the surface values, beliefs, and assumptions as they are challenged or possibly violated by the changes. Although on one hand there are some difficulties implicit in studying organizations that are undergoing extensive changes, the upside from a cultural perspective is that some of the phenomena are more salient because of vulnerability issues associated with the threat of change.

Sample

From a list of 204 organizational members supplied by the company, we selected a sample of 30 people randomly from within their functional areas, with the proportion roughly equivalent to the size of the functional area within the organization. For instance, field engineering was the largest functional area in the company, and a proportionately large number of field engineers were invited to participate. The resulting sample of invited participants included 13 from field engineering, 8 from sales, 6 from administration and support, 2 from human resources, and 2 from technical support. Of those 30 people, 12 agreed to participate, 14 declined the invitation without explanation, and 4 agreed to participate but could not attend at the time scheduled. We completed the exercise with 12 willing and available participants (5 women and 7 men). Of these participants, 5 were from field engineering, 2 were from sales, 2 were from human resources, and 2 were from administration and support; 1 was a technical analyst.

The Concept Mapping Procedure

Concept mapping is a structured conceptualization technique that results in a *concept map*. Concept mapping may be defined as follows:

> A concept map is a pictorial representation of a group's thinking which displays all of the ideas of the group relative to the topic at hand, shows how these ideas are related to each other and, optionally, shows which ideas are more relevant, important, or appropriate. (Trochim, 1989b, p. 2)

Other related approaches to structuring ideas include techniques known as *cognitive mapping* or *mind mapping*. Most differences between the various forms of concept mapping and cognitive or mind mapping center on how the maps are constructed and interpreted. Cognitive and mind maps are sometimes the result of one person or a small group sketching ideas in relation to one another freehand on a piece of paper, white board, or newsprint. Hand-drawn concept maps were introduced by Novak and colleagues (Novak & Gowan, 1984; Novak, Gowan, & Johansen, 1983) as a technique for educators to organize and structure knowledge in relation to the learning process. In the management literature, Huff (1990) mapped strategic thought, and Daniels, Johnson, and de Chernatony (1994) used cognitive maps to assess and compare managers' mental models of a particular industry.

The concept mapping procedure used here was developed by Trochim (1987, 1989b). Similar methods have also been used by Wiener, Wiley, Huelsman, and Hilgemann (1994). Trochim's concept mapping procedure is a hybrid method, using aspects of both qualitative and quantitative approaches to inquiry. Data are generated from participants in their own words, and maps are interpreted to reflect participants' emic context-bound meaning of the phenomena in focus. As part of the process, however, data are structured, quantified, and analyzed using statistical methods including multidimensional scaling (MDS) and hierarchical cluster analysis. Trochim's concept mapping process involves five steps:

1. Brainstorming items (concepts) related to focus issue
2. Structuring data by sorting and rating brainstormed items
3. Aggregating data using MDS and cluster analysis
4. Interpreting the maps
5. Using the results for further analysis, research, and planning

Step 1. Participants were assembled in a company training room and asked to brainstorm concepts around the focus issue: "The culture of NCR/AT&T. How things get done around here." The statements generated reflect a broad array of cultural phenomena including rituals, behaviors, ideas, assumptions, values, and beliefs that are represented by Schein's (1984) three fundamental levels of culture—that is, observable artifacts, values, and assumptions. Concepts were listed on a white board by the researchers so that participants could keep track of what had been said and researchers could later record the list. A list of 74

concepts was generated by the participants. The researchers transferred the concept list to a rating sheet in no particular order. Sorting decks of concepts were then created with one item per card (1" × 3" piece of paper) for the sorting procedure.

Step 2. During the second session, participants were instructed to sort the 74 concepts into piles. The instructions were to "sort the items (concepts) into groups or piles which make sense to you." Once the piles of concepts were determined, each participant then recorded his or her concept piles onto a sheet of paper provided by the researchers. For instance, a participant might have written under "Pile #1" the following item numbers: 73, 56, 17, 42, 25, 3, 37. Participants were instructed to write a title or theme that represented a pile if possible. Although writing theme names for concept sort piles was optional, all participants did provide a title for each of their sorted groupings (piles) of concepts. These titles formed the basis of the researchers' first iteration of cluster titles (shown in Table 2).

Participants were also given a rating sheet containing the list of 74 items. They were asked to rate each item from 1 to 5 based on its relative importance to the focus issue—namely, the culture of NCR/AT&T. The instructions read as follows:

> For each of the items listed below, please rate the item (concept) from 1 to 5 according to that item's significance to "how things are done in NCR/AT&T," where
>
> 1 = "of no significance"
> 2 = "somewhat significant"
> 3 = "significant"
> 4 = "very significant"
> 5 = "extremely significant"
>
> All items will probably exist in NCR/AT&T and all may be of some significance; however, it is useful to have a spread of ratings, so please try to identify the most significant items, less significant and least significant items relative to the NCR/AT&T New Zealand culture.

Step 3. The sort and rate data were entered into the Concept System[2] computer program (Trochim, 1987), which aggregates the sort data using MDS based on a binary, symmetric matrix of similarities, represented in a two-dimensional solution. Although MDS may deliver solutions in one to five dimensions, two-dimensional configurations are generally easy to display and practical to use, especially when used in conjunction with cluster analysis (Kruskal & Wish, 1978). The MDS final stress value for the map was 0.2522, indicating a reasonably good fit between the data and a two-dimensional solution. These data were then the input for a hierarchical cluster analysis using Ward's algorithm (Everitt, 1980). The average interperson correlation, corrected by the Spearman Brown formula, was 0.75 for the sort data and 0.72 for the rating data. For more detailed descriptions of these statistical procedures, see Trochim (1994) regarding the Concept System and Wiener et al. (1994) for concept mapping using the SAS computer application. The Concept System computer program produces maps in several formats. A point map is the basis of all other maps and represents each individual concept as a point in relation to other points (concepts) based on the criterion that concepts placed in piles together more often are located more proximately, whereas those piled together less often are located further apart on the map. The point map for this study is shown in Figure 1.

Individual points do not change position on the map, but the clustering of points is manipulated by the researcher to yield a map in which (a) clusters contain items related to a common theme and (b) each cluster theme is somewhat distinctive from other clusters. In this case, we printed out cluster maps ranging from 4- to 10-cluster solutions. Then, using an iterative process, we began eliminating solutions. Maps with fewer than 7 clusters included clusters with a broad array of concepts, making it difficult to find a common theme and/or "forcing" concepts together that were contradictory or highly dissimilar to one another. Conversely, maps with more than 7 clusters included smaller clusters with repetitious themes. Ultimately, a 7-cluster map was judged by the researchers to represent a workable solution. The clustered items and their thematic names are listed in Table 1. The cluster list also specifies individual item average ratings and cluster average ratings.

A cluster map showing cluster results (without rating results) is shown in Figure 2.

Step 4. The resulting map was shown to participants who commented on its validity and offered their personal interpretation of the meaning of the concept map. Participants generally found the concept map to have meaning for them—that is, in general, the cluster names and relative importance of clusters made sense to them. Cluster names were refined at this stage.

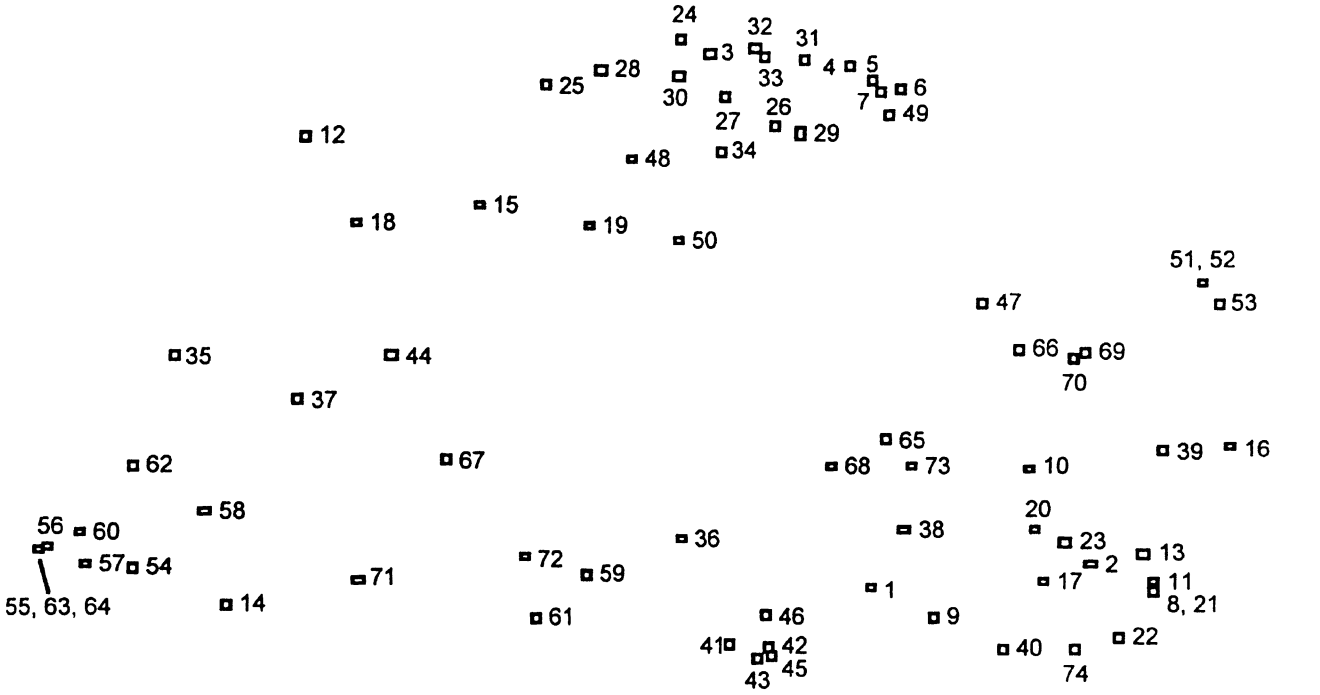

Figure 1. NCR/AT&T point map.

Some cluster names were changed and modified to better reflect participants' interpretations of their culture(s) (see Table 2).

The final map, shown in Figure 3, includes cluster names suggested by participants as they interpreted the results. The map also represents the relative importance of each cluster (average item rating) in the form of one to five layers of cluster height or elevation.

Step 5. The concept maps generated through this process were interpreted within the context of a larger, in-depth field study exploring the relationship between organizational culture and national culture in two U.S.-owned multinational corporations operating in New Zealand. The larger study involved one of the authors spending 1 year at NCR/AT&T exploring the impact of off-shore ownership on the cultures within the New Zealand subsidiary. The study examined how change was managed, how diversity initiatives were implemented, and how the New Zealand office addressed directives and changes initiated in the United States. The maps, therefore, were not used as standalone findings but as pictorial representations of NCR/AT&T culture, which were used as a starting point for the larger study. Overall, the larger study, in addition to the concept maps, included data collected via interviews, document analysis, observation, and participant observation (Shepherd, 1997, in press).

Reading and Interpreting the Concept Map

The relative cluster rating averages for each cluster are portrayed on the concept map as higher or lower cluster height, indicated in the output graphics as two-dimensional layers. For example, a cluster with one layer (see the Events and Rituals cluster in Figure 3) contains items that have a lower average rating (2.60) than a cluster with two or more layers. In contrast, a cluster with five layers (see The Times They Are a Changin' cluster in Figure 3) contains concepts with a relatively high average rating (3.75). Cluster layers indicate that participants rated items in the Events and Rituals cluster to be relatively less salient aspects of NCR/AT&T cultures than are the items contained in The Times They Are a Changin' cluster. Variations in cluster height give the concept map a three-dimensional look. Using the map analogy, clusters look like islands or geographic highlands and lowlands. The algorithms used, however, do not attribute priority to top/bottom ("north/south") or right/left

Table 1
Concept Clusters

Cluster 1: Constraints of Bureaucracy
1. Conservative (2.55)
9. Managerial fear (2.45)
38. Field engineering put down as a second class (2.82)
22. Reporting system overly complex for New Zealand (3.45)
74. Juggling budgets between departments—makes some departments more profitable than others (3.55)
40. "Them" and "us" between divisions (3.45)
2. Strict policy orientation (3.36)
13. Shield customer from internal shambles (3.45)
17. Interdepartmental charges "greenies" (2.91)
20. Restricted by CSIM system (2.64)
23. Antiquated systems (3.82)
8. Led by the nose from America (4.00)
21. Restricted by reporting back to America (3.36)
11. U.S. directives unproductive for New Zealand—removes our focus (3.64)
Cluster average = 3.25

Cluster 2: Interpersonal and Communication Issues
36. Clashes of ideas taken personally (2.64)
59. Recruitment differences, for example, sales versus engineers (2.36)
72. Different types in company, for example, engineers—introverts, sales—extroverts (3.00)
61. People feel pressure to socialize in teams, not whole company (2.55)
41. Deliberate lack of communication between coaches and associates (3.18)
42. Information controlled between coaches and associates (3.27)
43. Information controlled between and among branches in New Zealand (2.36)
45. Sense of head office versus everyone (2.91)
46. Wellington a distinct branch (2.82)
Cluster average = 2.79

Cluster 3: Ingrained Aspects of NCR
10. Nonprofessionalism (2.00)
65. Miracles of tolerance (3.09)
73. Lack of consultation with all parties in relation to changes (3.55)
68. Everything has to be done yesterday (3.55)
16. Set divisions (3.55)
39. Divisions interact differently (3.36)
Cluster average (3.18)

Cluster 4: Beyond Individual's Control
47. Common bond values lip service from big coaches in America (3.00)
66. Miracles—kiwi ingenuity (2.91)
69. Shortcuts around/through the formal system (2.55)
70. Personal contacts make shortcuts possible (especially in Auckland) (3.27)
51. Move toward looking after big customers, major accounts (3.91)
52. Customers—drive toward a selected few, eggs in only a few baskets (3.91)
53. Lack of value given to minor accounts (even if loyal to NCR for many years) (3.91)
Cluster average = 3.35

Cluster 5: The Times They Are a Changin'
3. Changes in attitude (3.35)
24. Common bond values (3.55)
27. Team work (3.73)
30. Change in initiatives accepted in the long run (3.27)
4. Changes in structure (4.27)
31. Change initiatives—teaming (3.55)
32. Change initiatives—quality (4.00)
33. Change initiatives—customer focus (3.91)
25. Integrity (3.92)
28. Innovation (3.09)
5. Changes in staff composition (3.82)
6. Changes to business focus (4.18)
7. Changes to leadership (4.09)
49. Teams made up of coaches and associates (2.91)
19. Quality policy orientated (3.82)
50. Understanding internal customer needs (3.55)
26. Respect for individuals (3.64)

(Continued)

Table 1
Continued

Cluster 5: The Times They Are a Changin'
- 29. Dedication to helping customers (4.09)
- 34. Culture is changing (4.09)
- 48. Customer satisfaction—both internal and external (4.00)

Cluster average = 3.75

Cluster 6: Reasons for Success
- 12. Technology innovators (3.27)
- 15. Professionalism (3.55)
- 18. Radical projects (2.00)
- 35. Friendly and caring (3.27)
- 37. Company takes care of its people (3.09)
- 44. Within a branch (or a building) anyone can approach anyone (3.73)
- 67. Unsociable (long) work hours (3.27)

Cluster average = 3.17

Cluster 7: Events and Rituals
- 14. Regular company-wide staff meetings (2.45)
- 71. Social company, but often at a divisional level (3.18)
- 58. Engineers: "useless tool of the month" (2.09)
- 62. Status not an issue socially (3.00)
- 45. Thanksgiving dinner—tradition at local branch level (2.45)
- 57. Managing director award—monthly event; outstanding performance rewarded (2.27)
- 55. 25-year club (annual dinner) current and past employees and their spouses (2.82)
- 63. Periodic outside-of-work events (golf, dragon boating, touch, round the bays) (2.82)
- 64. Outside work events initiated by outside interest groups, social club (2.45)
- 56. CPC/sales convention (2.27)
- 60. Social club—bar in main office but only a core division attend (2.82)

Cluster average = 2.60

Note: Average item ratings are in parentheses. CSIM = Customer Services Inventory Management; CPC = Customer Points Convention.

("east/west") dimensions. Therefore, where a particular cluster is located on the map in terms of top/ bottom or right/left is arbitrary. Maps may be rotated or turned upside down with equal meaning. Cluster proximity, however, is important. Two closely situated clusters are more similar than clusters separated by a greater distance. For example, the concepts in the Beyond Individual's Control cluster are more similar to the concepts in the Ingrained Aspects of NCR cluster than they are to concepts in The Times They Are a Changin cluster. Having used MDS to establish a point map (see Figure 1), following Trochim's (1989a) technique, we used cluster analysis, rather than dimension analysis (e.g., Kruskal & Wish, 1978), to interpret the map. Cluster analysis allowed us to group items by similarity without restricting us to a limited number of dimensions.

In the following section, an interpretation of the concept map is offered drawing from three sources. First, we, as researchers, interpreted the clusters based on our understanding of the concepts within each cluster. Second, we did a member check (Lincoln & Guba, 1985) with each of the 12 participants to gather their views on our categories and to offer their suggestions. The modified cluster names are shown in Table 2. Apart from suggesting alternative cluster names, the participants indicated that the items as clustered made sense to them. Third, we, the researchers, expanded our analysis of the clusters and the full concept map to include some plausible explanations, as described in the Results section below.

RESULTS

What does this concept map in Figure 3 show us about the NCR/AT&T GIS cultures at the time of this study? Beginning on the left side of the map, there is a cluster representing some classic (e.g., Deal & Kennedy, 1982) cultural phenomena. This cluster is entitled Events and Rituals. It contains items such as regular company-wide monthly staff meetings, engineers' "useless tool of the month" ritual, the Thanksgiving dinner tradition (transplanted from NCR's North American heritage), the managing director award, the 25-year club for long-serving employees, and various other social events that occur periodically both inside and outside the workplace. In summary, these events and rituals punctuate day-to-day life at AT&T, publicly recognizing and celebrating success within the organization. The importance rating average for these items is the lowest of any cluster, with a mean of 2.60

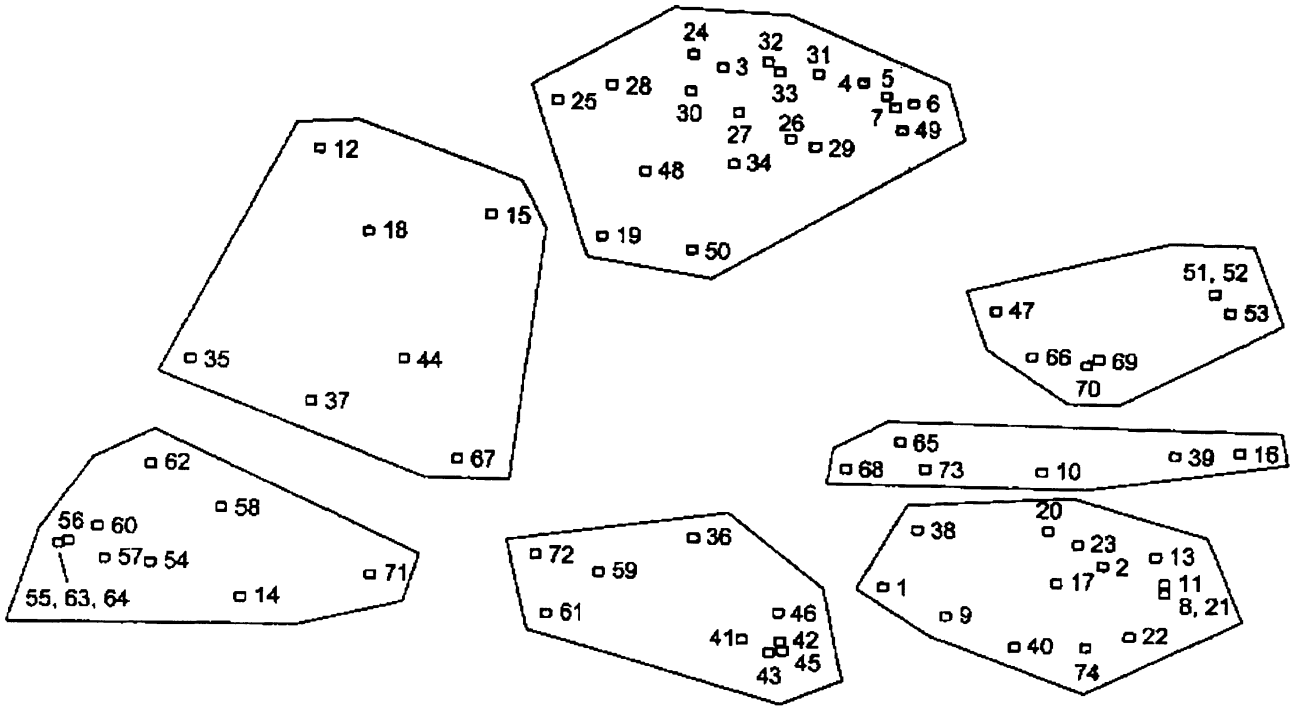

Figure 2. Clustered point map (without relative importance—height—of clusters indicated).

on a scale of 5, suggesting what participants described elsewhere as a fairly bland and routine organization.

Moving upward on the left side of the map is a cluster named Reasons for Success. Other names suggested by participants to describe this cluster included Innovation as well as Factors for Success. Items contained in this cluster include technology innovators; professionalism; radical projects; friendly and caring; company takes care of its people; within branch or building, anyone can approach anyone; and unsociable ("long") work hours. Most cultures have a story of how they got to where they are. For these employees, the story of how the former NCR achieved success was a story of innovation, caring, and hard work. The cluster average item rating was 3.17, third lowest among clusters. Taken together, the two clusters on the left side of the concept map could be seen as a region of, on average, weaker attributes of NCR/AT&T's organizational life at the time of the study. It could be construed to represent the bright side of life at the former NCR. Or, alternatively, given the changes through which the organization was going, it could be that the relative attention or focus on how they got there was of less concern to participants than where they were going and what they were dealing with at the time of the study.

Shifting to the right side of the map, we see a region of three clusters respectively titled Constraints of Bureaucracy, Ingrained Aspects of NCR, and Beyond Individual's Control. This region represents elements of an organizational culture bound by tradition, hierarchy, and control, consistent with the former NCR. Constraints of Bureaucracy contained items such as conservative, managerial fear, reporting system overly complex, them-and-us between divisions, strict policy orientation, shield customer from internal shambles, antiquated systems, led by the nose from America, and restricted by reporting back to America. The Ingrained Aspects of NCR cluster contained items including nonprofessionalism, miracles of tolerance, lack of consultation in relation to change, everything has to be done yesterday, set divisions, and divisions interact differently. The cluster titled Beyond Individual's Control included aspects of the old culture that are being affected by the recent changes in the company. For example, there has been a shift imposed from corporate headquarters in America from supporting many smaller customers toward making fewer but larger customers a priority. Items included in this cluster reflect that strategic shift—lack of value given to minor accounts, even if loyal to the company; move toward looking after big customers (major ac-

Table 2
Modifications of Cluster Titles

Cluster Number	*Researchers' Suggested Cluster Titles*	*Cluster Titles Derived From Participant Input*
1	Structural and Reporting Constraints	Constraints of Bureaucracy
2	Personal and Social Concerns	Interpersonal and Communication Issues
3	Outside the Formal System	Ingrained Aspects of NCR
4	Beyond Individual's Control	Beyond Individual's Control
5	Times Are Changing	The Times They Are a Changin'
6	Ambiguous Aspects of Work Life	Reasons for Success
7	Social Events and Rituals	Events and Rituals

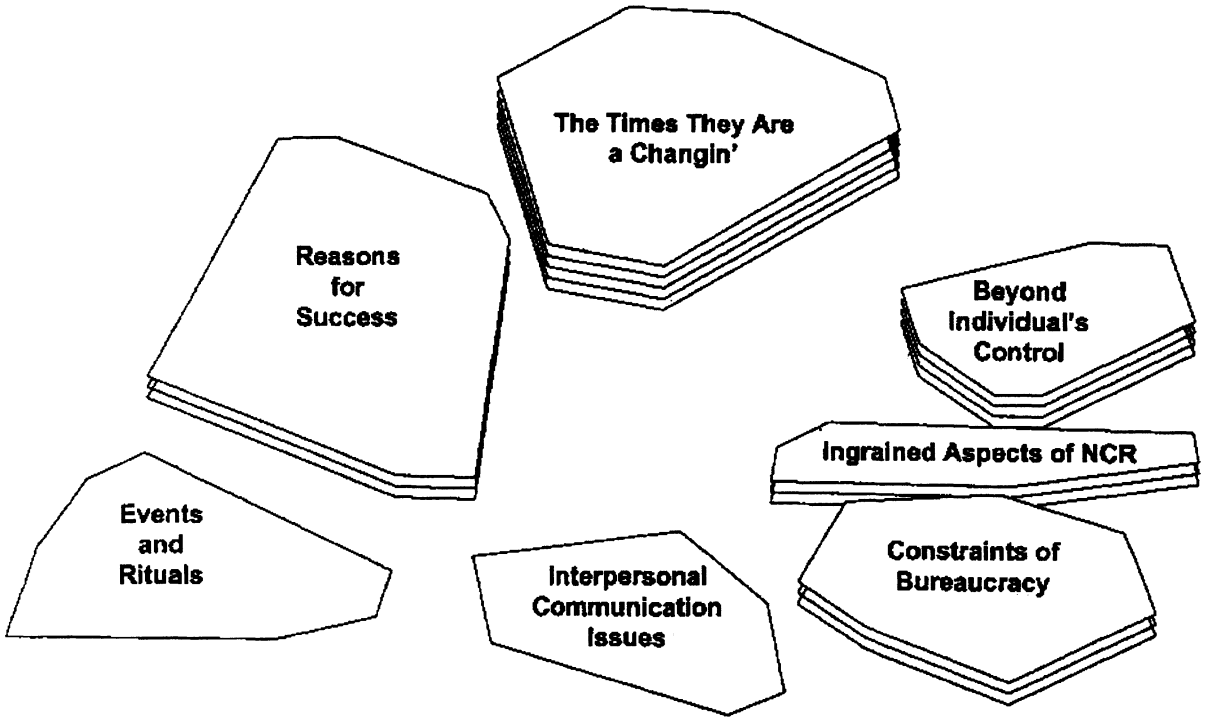

Figure 3. Concept map: NCR/AT&T cultures.

counts); and drive toward a select few customers (eggs in only a few baskets). Such strategic shifts were generally perceived to be beyond the control of individuals within the organization. This cluster also features ways in which individuals get around the bureaucratic and imposed constraints. For instance, shortcuts around and through the formal system and miracles of Kiwi ingenuity appear as internal, informal responses to externally imposed, formal controls. Finally, this cluster contains an item reflecting some members' cynicism about whether or not senior managers are buying into the change initiative underway in the organization (i.e., common bond values given lip service from big coaches).

Clusters in the right region of the map have higher average importance ratings than the clusters on the left. Also, 4 of the 12 highest rated items are found on the right side, whereas none are found in the left region. The 12 items with the highest average ratings are found in Table 3.

At the bottom of the concept map is a cluster named Interpersonal and Communication Issues. It contains items of clashing conflict and control within the organization. Concepts in this cluster include clashes of ideas taken personally; recruitment differences (e.g., sales verses engineers); different types in company (e.g., engineers—introverts); pressure to socialize in teams, not whole company; deliberate lack of commu-

Table 3
Concepts With Highest Average Ratings

Concepts	*Cluster in Which Concept Is Found*
Changes in structure (4.27)	The Times They Are a Changin'
Changes to leadership (4.09)	The Times They Are a Changin'
Dedication to helping customers (4.09)	The Times They Are a Changin'
Culture is changing (4.09)	The Times They Are a Changin'
Change initiatives—quality (4.00)	The Times They Are a Changin'
Customer satisfaction—internal/external (4.00)	The Times They Are a Changin'
Led by the nose from America (4.00)	Constraints of Bureaucracy
Move toward looking after big customers (3.91)	Beyond Individual's Control
Customers—drive toward selected few (3.91)	Beyond Individual's Control
Lack of value given minor accounts (3.91)	Beyond Individual's Control
Change initiatives—customer focus (3.91)	The Times They Are a Changin'
Integrity (3.91)	The Times They Are a Changin'

Note: Average ratings are in parentheses.

nication between coaches and associates; information controlled between coaches and associates; information controlled between and among branches throughout the country; sense of head office versus everyone else; and Wellington as a distinct branch.

The cluster titled The Times They Are a Changin' is at the crux of this organizational culture map. This cluster reflects many of the changing elements in the organization. It also contains 8 of the 12 highest rated individual items (see Table 3 above) and, overall, has the highest average item rating of any cluster on the map (3.75 on a 5-point scale). Its high rating relative to other clusters is denoted on the map with five boundary bars.

Change is the common theme of this cluster. Concepts include changes in structure, change initiatives—quality, change initiatives—customer focus, change initiatives—teaming, changes to leadership, changes in attitude, changes in staff composition, changes to business focus, one concept that simply noted that the culture is changing, and another that stated change initiatives accepted in the long run. Customer focus and attention to quality also figured prominently in this cluster. Items related to service quality included customer satisfaction—both internal and external, understanding internal customer needs, and quality policy oriented. The item called *Common Bond values* was also found in this group. Common Bond was the name of a change initiative being implemented within AT&T at the time of the study. Each of the Common Bond values was found in this cluster—dedication to helping customers, innovation, integrity, respect for individuals, and team work. The other major change program initiated by AT&T at the time of the study concentrated on team work and developing a flatter, more participative organizational structure (represented by the item called *teams made up of "coaches" and "associates"*) with a strong quality and customer focus. The change initiatives at AT&T provided a common language within the organization, and many of the items listed in this cluster were not surprisingly associated with change because these were formal change initiatives within the corporation.

From the concept map of NCR/AT&T, we conclude that change initiatives are prominent in the cultural landscape of NCR/AT&T. The changes taking place in the organization might also be seen as separate, distinct from, and in contradiction to the company's former operational style—that is, as an ingrained, constraining bureaucracy. Alternatively, the change cluster may be interpreted to be drawing all aspects of existing NCR/AT&T culture toward new foci and renewed values. The new values of teamwork and customer focus are distinctly opposed to the interpersonal communication problems and bureaucratic constraints, as well as issues that were beyond individuals' control and those associated with the old NCR way of functioning found in the clusters bearing those titles. Finally, events and rituals and reasons for success in the past are represented as distant lowlands in the context of the increasing attention given to the new traditions resulting from the change initiatives.

VALIDITY OF CONCEPT MAPS

As with any research method and regardless of one's epistemological stance, the trustworthiness (Lincoln & Guba, 1985) or validity (Cook & Campbell, 1979) (depending on one's perspective) of concept mapping is an important issue. There are two critical questions associated with the validity of concept mapping as a research method. First, does a particular concept map accurately represent the conceptual domain it is intended to represent? And second, does concept mapping measure or represent a conceptual domain better or worse than other research methods?

In attempting to address the first question, in the present study, the validity of the final concept map, including the cluster names, as a sensible repre-

sentation of AT&T's cultures was checked in two ways. First, as part of the interview process of the larger study described in Step 5 above, the research participants were asked to check and scrutinize the resulting concept maps. Checking findings with study participants, called a *member check*, is one means of assessing validity in naturalistic inquiry (Lincoln & Guba, 1985). It is based on the assumption that those who live and work in an organization know and understand the milieu of the organization at least as well as the researcher and that those with local knowledge can help researchers determine the accuracy or validity of claims made about their workplace. Second, although not triangulation per se, findings from the concept mapping procedures corresponded with findings from interviews and observations. For example, evidence of the conceptual theme of bureaucratic restraint was observed in the voluminous policy manuals and regulations found in the organization. And during interviews, participants consistently emphasized the centrality and importance of the changes occurring within the organization. We agree with Wiener et al. (1994) in saying that this combination of methods has many strengths.

The second issue is how well concept mapping might be expected to capture an organization's culture as compared with other methods. Daniels, de Chernatony, and Johnson (1995) concluded that although enhanced by use with other methods, visual card sort mapping is a valid stand-alone method for capturing managers' mental models. Markham, Mintzes, and Jones (1994) demonstrated the concurrent validity of concept mapping, using MDS, especially when such techniques are compared with unidimensional assessment tools, such as multichoice tests in an educational environment. Unidimensional tools, which would include survey instruments and/or culture audits in organizational research, are severely limited in capturing the interrelationships within or configural aspect of a conceptual domain. Identifying the configural aspect of a given conceptual domain, as tested by Markham et al. (1994), is a higher order portrayal of that conceptual domain than are other unidimensional representations. As Markham et al. stated,

> Furthermore, there appears to be general agreement among cognitive scientists and developmental psychologists that structural representations (such as concept maps) capture this configural property of knowledge better then any other presently available technique. (p. 100)

Moreover, the overall effect of this research technique on participants seems to be very positive. Participants tend to enjoy the process of brainstorming ideas related to their organization, to feel ownership in the process, and to appreciate that the final product of the research bears their own words and phrases that hold meaning for them. Further research on the effects of concept mapping on participants and its effects on other data collection efforts, nevertheless, is warranted.

DISCUSSION

A more complete discussion of the findings from this study as a multiperspective view of corporate culture is found elsewhere (Shepherd & Kolb, 1995, in press). The purpose of this article is to focus on the method of concept mapping used in this study as a tool for organizational culture research. We will first list some of the weaknesses in the present study and of concept mapping more generally, and then we wish to highlight what we consider to be strengths of the methodology, as demonstrated in this study.

In this study of the organization cultures of NCR/AT&T, due to organizational access issues, including the turbulent changes the organization was encountering, a small sample of participants was drawn from what is admittedly a large and complex organization. The sample was not only small but also biased in favor of certain functions of the organization (i.e., engineering and marketing). Furthermore, differences between the New Zealand branch versus other parts of this multinational corporation are significant and have been addressed and analyzed within a larger study framework (Shepherd, in press; Shepherd & Kolb, in press). This study in no way pretends to be generalizable to NCR/AT&T cultures in other parts of the world. Moreover, this study was designed intentionally to be a trial application of Trochim's (1989b) concept mapping procedure to the topic of organizational culture. As such, it falls short of demonstrating conclusively whether or not the methodology is appropriate for studying organizational cultures in other organizational settings. Further trials and expansions on this research are needed and welcomed.

Besides problems with this study's design and implementation, there are also weaknesses and drawbacks associated with concept mapping in general. First, as a snapshot of organizational culture, we do not know the extent to which the same concept map-

ping procedure would produce the same results if repeated; the question of reliability of the method requires further investigation. Second, concept maps, at present, are not particularly well suited for comparative research or theory testing, although developments are being made in this area. Correlations between one map and another are possible by using a technique known as pattern matching (Kolb, 1992; Trochim, 1989c). Third, the process is not automatically intuitive for some participants, and confusion can arise over the procedures, especially around the sorting of items and the interpretation of the maps. Some individuals are more inclined to conceptual thinking than others. We have found this to be more likely, but not necessarily the case, at lower qualified job levels within organizations. Fourth, arranging for several or many members of an organization to assemble on three occasions for the brainstorming, sort/rate, and interpretation activities can be more logistically demanding than simply arranging one-on-one interviews. And finally, the concept mapping procedure requires several steps of data processing from the brainstorming session to creating the sorting decks and rating sheets to entering the data and generating, evaluating, and reporting the maps. Although not a significant barrier, the concept mapping process does require a certain amount of organization and coordination, especially in large-scale research projects with over 50 participants.

Nevertheless, this study does, we believe, offer some useful contributions to the study of organizational cultures. First, we introduce concept mapping as an alternative approach to the study of organizational cultures. Studies of organizational cultures have, in the past, relied on either survey research in the form of culture audits or ethnographic techniques of inquiry, including observation, participant observation, document review, and interviews, thereby trading off quantitative methods for interpretive qualitative methods or vice versa. As an alternative to this either/or approach, concept mapping is a hybrid methodology that combines quantitative statistical data analysis with qualitative interpretative techniques. It allows data, generated from participants' own words, including their emic meanings, to be structured for and by multiple statistical analyses, which are then provided as an output (concept map) that maintains participants' own words and conceptual cluster names. Concept mapping can be said to combine the hard science of statistics with the art of human interpretation (Trochim, 1989a).

A second, and somewhat related, strength of concept mapping is its compatibility with other research methods. In a larger study, of which this research was one aspect, in-depth interviews, document content analysis, and researcher observations methods were used to gather data related to organization culture. The concept mapping findings offered complementary evidence supporting other findings regarding the cultures of NCR/AT&T.

Third, the intuitive and pictorial aspects of the method make it accessible to participants in corporate settings. As such, it can be likened to the proverbial photograph shown to a village by an outside visitor: Most participants can see something of themselves and their culture in the likeness. Finally, another positive aspect of the method is its practical utility. Although this study was conducted primarily for pure research purposes, one can imagine many uses of concept maps of an organization's culture(s) in applied and/or consulting contexts.

In conclusion, concept maps offer a visual snapshot of cultural elements. As the old saying goes, a picture is worth a thousand words. To extend the metaphor of photography, concept maps could be considered as a sort of organizational family portrait that may be interpreted very differently by individual members but that, at the same time, holds a certain amount of collective agreement about what is in the picture at the time it was taken. We are not suggesting that culture researchers substitute in-depth ethnographic studies of culture with concept mapping or other structured conceptualization techniques, but we believe that concept mapping is a complementary approach to ethnographic research methods. We argue that concept mapping combines the structure and statistical assistance of quantitative methods, while maintaining the emic, grounded, and stakeholder participation aspects of qualitative research.

We believe that our work offers beneficial insights and reconciliations between multiple realities of organizational culture. We feel that future developments in the field can be enhanced by establishing linkages between theoretical perspectives through innovative approaches to fieldwork. Despite the controversy about what it is and how to study it, it is our belief that a cultural perspective of organizations still has much to offer and is worthy of continued and sustained effort. We suggest that a structured, mixed-method tool such as concept mapping can assist in future exploration and application of the concept of organizational culture. The full value of concept mapping as

a research tool has yet to be fully realized. Although this exploratory study has limitations in terms of sample size and representation within the host corporation, it demonstrates the usefulness of concept mapping for studying organizational culture. We propose that concept mapping can be used as a complementary methodology to traditional ethnographic cultural research in organizational cultural studies and that this research methodology may broaden and enhance our understanding of organizations as cultures.

NOTES

1. The issue of how to refer to the company is somewhat problematic because at the time of completing the concept mapping, the company was called NCR, and the participants referred to it as such. However, during the time in which the overall study took place, the name changed to AT&T, GIS (Global Information Solutions), NZ. Consequently, we refer to the company as NCR/AT&T except, when applicable, the organization is referred to as NCR to reflect how the study participants identified with the old NCR as well as the new takeover company AT&T. To further complicate matters, the company has since the time of the study reverted back to the name NCR.

2. The Concept System computer software is a complete user-friendly program (for Windows) that is used to enter brainstormed statements, to print these for sorting and rating, to enter sorting and rating data, to conduct the statistical analysis (including MDS and hierarchical cluster analysis), and to display a variety of mapping results. Similar analyses can be conducted using other statistical packages such as SAS (Wiener et al., 1994).

REFERENCES

1993 AT&T Annual Report. (1994). *Bringing people together anytime, anywhere.* New York: AT&T.

Alvesson, M., & Berg, P. O. (1992). *Corporate culture and symbolism: An overview.* Berlin: Walter de Gruyter.

Christensen, D. (1988). Mirror, mission, and management: Reflections on folklore and culture in a health care organization. In M. O. Jones, M. D. Moore, & R. C. Snyder (Eds.), *Inside organizations* (49-62). Newbury Park, CA: Sage.

Cook, T. D., & Campbell, D. T. (1979). *Quasi-experimentation: Design and analysis issues for field settings.* Boston: Houghton Mifflin.

Daniels, K., de Chernatony, L., & Johnson, G. (1995). Validating a method for mapping managers' mental models of competitive industry structures. *Human Relations, 48*(9), 975-991.

Daniels, K., Johnson, G., & de Chernatony, L. (1994). Differences in managerial cognitions of competition. *British Journal of Management, 5*(special issue), 21-29.

Deal, T. E., & Kennedy, A. A. (1982). *Corporate cultures: The rites and rituals of corporate life.* Reading, MA: Addison-Wesley.

Everitt, B. (1980). *Cluster analysis* (2nd ed.). New York: Halsted.

Huff, A. (1990). *Mapping strategic thought.* New York: Wiley.

Jones, M. O., Moore, M. D., & Snyder, R. C. (Eds.). (1988). *Inside organizations.* Newbury Park, CA: Sage.

Kolb, D. G. (1992). The practicality of theory. *Journal of Experiential Education, 15*(2), 24-28.

Kolb, D. G. (1994). Mapping the wilds of adventure-based training. In A. Kouzmin, L. Still, & P. Clarke (Eds.), *New directions in management* (255-273). Sydney: McGraw-Hill.

Kruskal, J. B., & Wish, M. (1978). *Multidimensional scaling.* Beverly Hills, CA: Sage.

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry.* Beverly Hills, CA: Sage.

Louis, M. (1985). An investigator's guide to workplace culture. In P. Frost, L. Moore, M. Louis, C. Lundberg, & J. Martin (Eds.), *Organizational culture* (pp. 73-94). Beverly Hills, CA: Sage.

Markham, K. M., Mintzes, J. J., & Jones, M. G. (1994). The concept map as a research and evaluation tool: Further evidence of validity. *Journal of Research in Science Teaching, 31*(1), 91-101.

Martin, J. (1992). *Cultures in organizations: Three perspectives.* New York: Oxford University Press.

Novak, J. D., & Gowan, D. B. (1984). *Learning how to learn.* Cambridge, UK: Cambridge University Press.

Novak, J. D., Gowan, D. B., & Johansen, G. (1983). The use of concept mapping and knowledge vee mapping with junior high school science students. *Science Education, 67*, 625-645.

Ott, J. S. (1989). *The organizational culture perspective.* Pacific Grove, CA: Brooks/Cole.

Schein, E. H. (1984). Coming to a new awareness of organizational culture. *Sloan Management Review, 25*, 3-16.

Schein, E. H. (1985). *Organizational culture and leadership.* San Francisco: Jossey-Bass.

Shepherd, D. M. (1997). Common bond values at the New Zealand office of AT&T. In CCM Research Team (Ed.), *Cross-cultural management: Case studies development and delivery* (pp. 153-161). Sydney, Australia: Research Institute for Asia and Pacific Economic Co-operation.

Shepherd, D. M. (in press). *Organizational culture: Complexities in multinationals.* Doctoral dissertation, University of Auckland, New Zealand.

Shepherd, D. M., & Kolb, D. G. (1995, August). *Unity, diversity and paradox: Mapping multiple realities of organizational cultures.* Paper presented at the annual meeting of the Academy of Management, Vancouver, British Columbia.

Shepherd, D. M., & Kolb, D. G. (in press). Unity, diversity and paradox: Mapping multiple realities of organizational cultures. *Studies in Cultures, Organizations and Societies.*

Siehl, C., & Martin, J. (1988). Measuring organizational culture: Mixing qualitative and quantitative methods. In M. O. Jones, M. D. Moore, & R. C. Snyder (Eds.), *Inside organizations* (79-103). Newbury Park, CA: Sage.

Thomas, J. L., & McDonald, M. R. (1994). Toward a national research agenda for occupational safety and risk-control management. *Professional Safety*, *39*(1), 18-24.

Trice, H. M., & Beyer, J. M. (1993). *The cultures of work organizations*. Englewood Cliffs, NJ: Prentice Hall.

Trochim, W.M.K. (1987). *The concept system* [Computer program]. Ithaca, NY: Concept Systems.

Trochim, W.M.K. (1989a). Concept mapping: Soft science or hard art? *Evaluation and Program Planning*, *12*(1), 87-110.

Trochim, W.M.K. (1989b). An introduction to concept mapping for planning and evaluation. *Evaluation and Program Planning*, *12*(1), 1-16.

Trochim, W.M.K. (1989c). Outcome pattern matching and program theory. *Evaluation and Program Planning*, *12*(4), 355-366.

Trochim, W.M.K. (1993, November). *The reliability of concept mapping*. Paper presented at the annual conference of the American Evaluation Association, Dallas, TX.

Trochim, W.M.K., Cook, J., & Setze, R. J. (1994). Using concept mapping to develop a conceptual framework of staff's views of a supported employment program for individuals with a severe mental illness. *Journal of Consulting and Clinical Psychology*, *62*(4), 766-775.

Wiener, R. L., Wiley, D., Huelsman, T., & Hilgemann, A. (1994). Needs assessment: Combining qualitative interviews and concept mapping methodology. *Evaluation Review*, *18*(2), 227-240.