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# Measuring resilience in health care provider organizations

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## Abstract

Health care providers offer an ideal setting to study the effectiveness of resilient behavior. The notion of a resilient organization is an emerging concept for understanding and coping with the modern-day pace of change and associated work stress. Resilience is the ability of an individual or organization to expeditiously design and implement positive adaptive behaviors matched to the immediate situation, while enduring minimal stress. This paper reports on the development and testing of several scales designed to measure aspects of resilience in the health care provider industry. Six factors explaining over half the instrument variance were found, including: goal-directed solution seeking; avoidance; critical understanding; role dependence; source reliance; and resource access. Results are discussed and future research is outlined.

## Why resilience?

Workers today constantly face change – in the work they do, how they perform the work, where the work is performed, and with whom they work. These internal changes represent only part of the challenge – external changes are increasingly felt by employees who now have more responsibilities dealing directly with outside suppliers and the customer. Trying to keep up with technology is a never-ending battle. Just when you figured out the software on your PC and worked out most of the bugs, the next Windows platform hits the shelves with its associated software upgrades. You can put off this change only until you start exchanging files and your software cannot read what you have been sent. Then, you are forced to change.

When a worker took a business trip, he or she was *incommunicado* with respect to the office until arrival at an airport, hotel, or client site. Now, many workers carry pagers, cellular phones, and computers with fax and e-mail capability, not to mention the phones on airplanes and business centers in airports. Rather than read up on company reports or actually write something using a pen, workers armed with these new technologies are expected to use them. Suddenly, workers at satellite facilities or conferences carry many of the normal work responsibilities with them as well as adding the new responsibilities associated with the offsite assignment.

The downsizing of many organizations has left behind fewer people to continue accomplishing the same mission. Information technology offered the promise of increasing productivity and giving us more leisure time to enjoy. What is the net effect? As mentioned above, we are tethered by various communication devices during the work day, leaving precious little time to work on projects requiring blocks of time to think, brainstorm, write, and create. And many now spend a portion of their leisure time on a worklike sedentary activity resulting from the “information age” – surfing the Internet.

As workers become more empowered, more important decisions are made, often without immediate approval and under time pressure. Meeting customer needs on the spot is essential in the service economy of the late 1990s. This, too, creates more pressure on the worker to assess the situation quickly, decide what can be offered to the customer, be able

to defend what he or she has done, and quickly move on to the next situation. Often, workers are placed in these situations without adequate training, preparation, or resources. The worker needs to learn how to be resilient, that is, how quickly to design and implement positive adaptive behaviors matched to the immediate situation, all the while enduring minimal psychological stress. These resilient behaviors help workers meet customer needs on the spot, capture opportunities that may otherwise be lost, and avert catastrophes by acting quickly and effectively in crisis situations.

Health care workers, in particular, often find themselves on the front line facing life or death decisions, then moving on to the next case. Human resource managers in health care need better tools to understand the impact of stress and change on their work force so effective interventions can be implemented. Some workers thrive in chaotic and stressful environments; others burn out after several months or years. What characteristics do the successful health care workers have that makes them resilient? Do the ones who burn out lack something or can they learn to be more resilient? In the extreme, resilience is needed to save lives. In more routine environments, resilience is needed to preserve sanity and survival.

This paper embarks on a new research stream to begin answering these questions (see Mallak, 1997 for a full discussion of the conceptual background concerning organizational resilience). The concept of resilience has been studied in early childhood psychology but very little has been done for workers in organizations, let alone in health care provider organizations. Some of the lessons learned by these child psychology studies can be applied to organizations, but new studies aimed at learning about organizations should provide more useful results for those seeking to become more resilient in their organizations. For this paper, I define resilience as the ability of an individual or organization to expeditiously design and implement positive adaptive behaviors matched to the immediate situation, while enduring minimal stress.

## Measuring resilience

### Resilience scale development

Dramatic episodes of resilient behavior occur when faced with a crisis. Natural disasters

throughout the world provide newscasts with stories about how a person risked his or her life to save another, ran back into a burning house to save an elderly person or a child, or fashioned an escape from enemy territory. Weick (1993) reported the case of the Mann Gulch disaster. He identified bricolage as one of four sources of resilience, based on his analysis of the case. Bricolage concerns creating order out of whatever is available. For example, smokejumpers in the Mann Gulch disaster did not always rely on their specialized firefighting knowledge, knowledge that would help them avoid potentially deadly actions and find their way out of the fire. Three scales were developed to assist in assessing the organizational resilience. Coping scales have been developed in the literature and will be incorporated into the research when the additional scales have been shown reliable and valid measures of resilience. The scales developed were based on three concepts discussed in Weick (1993):

- (1) bricolage;
- (2) attitude of wisdom; and
- (3) virtual role system (VRS).

### *Bricolage*

Bricolage refers to the practice of creating order out of whatever materials were available at the time.

Bricoleurs remain creative under pressure, precisely because they routinely act in chaotic conditions and pull order out of them. Thus, when situations unravel, this is simply normal natural trouble for bricoleurs and they proceed with whatever materials are on hand (Weick, 1993, p. 639).

Items in the bricolage scale include the ability to work under pressure, fight/flight reactions to overwhelming situations, ability to access appropriate resources.

### *Attitude of wisdom*

A story recounted of the Naskapi Indians (Weick, 1993) demonstrates what is meant by the attitude of wisdom. The Naskapi Indians use caribou bones to locate game. They hold bones over a fire until the bones crack and then hunt in the directions where the cracks point. This ritual is effective because the decision is not influenced by the outcomes of past hunts, which protects the stock of animals. The final decision is not influenced by the inevitable patterns of human choice, which enables hunted animals to become sensitized to humans and take evasive action.

The attitude of wisdom here is shown by ambivalence toward the past. The practice of divination incorporates the attitude of wisdom because past experience is discounted when a new set of cracks forms a crude map for the hunt. Past experience is also given some weight, because a seasoned hunter “reads” the cracks and injects some of his own past experience into an interpretation of what the cracks mean. The reader is crucial. If the reader’s hunches dominate, randomization is lost. If the cracks dominate, then the experience base is discarded. Items in the wisdom scale concern past experience, scepticism, curiosity, and reliance on single or multiple sources of information (Weick, 1993).

#### *Virtual role system*

The virtual role system (VRS) refers to an advanced form of work team relationships. Modeled after Weick’s work in crisis management, a VRS provides a work environment where the team can continue in the absence of one or more members. This continuity comes from each person’s ability to visualize the entire team functions, not just their particular role. Much like a holograph, where each smaller piece contains information to construct the whole, each person in a virtual role system can reconstitute the group in their mind and run a credible version of each role in that system. The VRS scale contains items on how well team members understand their roles, the roles of others, their ability to take on others’ roles, and how an overall vision provides role definition.

## Methods and results

### **Instrument development and data collection**

Items were written considering the respondent’s experiences and ability to be self-conscious of resilience behaviors and attitudes. The scales were pretested with a group of 50 graduate students enrolled in a masters degree program at a midwestern US university. Based on these pretests, items were changed, added, and deleted to improve the understanding of the item and its relationship to the underlying construct being measured.

The first large-scale testing of these scales was performed among nursing executives in Michigan hospitals. A survey, consent form, and stamped return envelope were sent via US mail to 445 nursing executives at 168

acute care hospitals in Michigan. A total of 128 surveys were returned for a 29 per cent response rate.

### **Scale analysis**

The first step of testing the scales was to use confirmatory factor analysis. Factor analysis is a means of describing a characteristic that is not directly observable, sometimes called a latent factor, based on a set of observable variables. This is accomplished through analysis of the variables where isolation of what the variables have in common is used to describe the characteristic or latent factor. An example is wisdom, which cannot be directly observed but may be a combination of factors such as scepticism and curiosity. The advantage of using the latent factors is that they represent a parsimonious method of describing the characteristics within the scales and can be used for further analysis. The factor analysis was conducted using principal components analysis where linear combinations of the observed variable were formed.

This was followed by two tests that measure sample characteristics necessary for factor analysis. The first test, the Kaiser Meyer Olkin’s test, commonly referred to as KMO, was done to determine the sampling adequacy. This test criterion was met using a cutoff of 0.60 as suggested by Kaiser (1974).

Second, the Bartlett Test of Sphericity was used to determine whether the correlation matrix is an identity matrix. All the factors had a corresponding significance of at least 0.0001 level, thereby rejecting the null hypothesis of an identity matrix. At this point, the data were determined acceptable for further analysis.

Consideration of how many factors were represented by the data was determined by a cut-off score of 1.00 for the eigenvalue. The number of factors having been determined, a lower limit of 0.40 was set for factor loadings in order to maintain the stringency of the analysis. Most of the factor loadings fell in the 0.60 through 0.80 range.

Finally, the factors were tested for internal consistency using Cronbach’s Alpha reliability test. To be consistent with the current literature in the field, the minimum cutoff score on the Cronbach’s Alpha was set at 0.6.

Based on these analyses, six factors were retained (see Table I):

Table 1 Six factors resulted from the resilience scales

Factor 1 (28.5%) Goal-directed solution seeking	Factor 2 (7.1%) Avoidance	Factor 3 (6.6%) Critical understanding	Factor 4 (5.6%) Role dependence	Factor 5 (4.7%) Source reliance	Factor 6 (4.3%) Resource access
Reliability ( $\alpha$ ) = 0.8548	Reliability ( $\alpha$ ) = 0.7865	Reliability ( $\alpha$ ) = 0.6966	Reliability ( $\alpha$ ) = 0.7942	Reliability ( $\alpha$ ) = 0.8895	Reliability ( $\alpha$ ) = 0.6994
Enjoy improvising solutions to problems	Feel overwhelmed when situation becomes chaotic	Try to make sense of the situation when it becomes chaotic	Team members can perform each other's roles	(-) Rely on one source of information	Have access to resources
Take delight in solving difficult problems	Escape when situation becomes chaotic	Know what resources to access	Team members can take on each other's roles	Rely on multiple source of information	Would use those resources even if not authorized to do so
Consider many feasible solutions	Back off from problem when overwhelmed	Careful when sharing information	Team members can act in the place of another		Has the knowledge needed to do the job
Team's goals guide individual actions	Avoid taking risks	Understand implications of possible implications			
Show confidence in decisions affecting the team	Approach new situations with skepticism				
Discuss team roles with each other					
Team's overall goals are understood					

**Notes:** Numbers in parentheses indicate amount of variance explained by each factor  
Items preceded by (-) indicate negative loading on the factor

- (1) goal-directed solution-seeking;
- (2) avoidance;
- (3) critical understanding;
- (4) role dependence;
- (5) source reliance; and
- (6) resource access.

Together they accounted for 56.8 per cent of the variance in the instrument. The original scales used in this research did not cluster. However, the theoretical basis behind those scales allowed for the development of items that, although grouped differently than expected, provide measurement methods for the complex construct of resilience. A brief discussion of each resulting factor follows.

#### *Goal-directed solution-seeking*

Accounting for over a quarter of the variance, this factor brings together the need for goals and a vision to guide creative processes in seeking solutions to problems. The resilient individual enjoys improvising solutions and tackling difficult problems. When working in a team, resilience requires confidence in team decisions. This follows logically from the

examination of a crisis situation where there is often little time to question decisions.

#### *Avoidance/skepticism*

The existence of this factor is counter to the "bricolage" notion of approaching problems and solving them with whatever tools are on hand. This factor suggests people should back off from problems and escape chaotic situations. Indeed, the factor also includes "approaching new situations with skepticism", an item associated with the attitude of wisdom concept. As this is early in the research stream, validity studies will shed greater light into the role of each of these and other resultant factors associated with resilience.

#### *Critical understanding*

The effective use of information to aid critical understanding was a key factor of resilience. Resilient individuals try to make sense of the situation when chaos ensues. They know what resources to access and consider the implications of possible solutions. Care in sharing information ensures those who need the information will get it; information will not be

shared if individuals could make the situation worse by having that information or those who do not have a “need to know”.

#### *Role dependence*

This factor is a subset of the original virtual role system scale. Essential to advanced team functioning, i.e. its resilience is the ability to fill in for a missing team member. This requires knowledge not only of that team member’s role, but also of all roles and how those roles interact in a unified whole.

#### *Source reliance*

Source reliance showed resilient individuals rely on multiple sources of information. This allows for the construction of a reality based on richer information, thereby reducing the effects of bias if those sources have been chosen carefully and are balanced. Just as a journalist is expected to have multiple sources to present alternate viewpoints and get closer to the “truth”, organizations benefit from a similar approach.

#### *Resource access*

The resilient individual not only does all of the above, he/she has the knowledge needed to do the job, has access to resources or would access them anyway, even if not authorized, to resolve a situation. This is especially interesting given the hospital setting chosen for this study.

### **Conclusion**

These six factors are a start in a research stream targeted at identifying dimensions of resilient organizations and behaviors of resilient individuals. Human resource

managers in health care settings can begin to use these findings to design interventions targeted at producing a more resilient work force. Many of the resultant factors have cultural implications, thereby requiring greater involvement of upper-level administrators in the intervention process. This study demonstrated the importance of using information effectively, through critical evaluation, and creatively seeking solutions. The subsequent stages of this research will study the validity of resultant factors and relationships between resilience measures and outcome variables in the health care industry, such as average length of stay, cost per patient day, and staffing levels. Coping strategies, as investigated in the psychology literature, will be integrated into future studies to add how individuals react behaviorally to different types of organizational stressors. Further applications of the resilience scales will investigate their reliability and validity in other settings, including manufacturing and government organizations. This research will strive to help the modern-day worker become more effective in an increasingly complex and stressful work environment.

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