Behavioral Systems Analysis: Fundamental concepts and cutting edge applications

Part IV Four Concepts

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Part I of this series of articles:

- describes behavioral systems analysis as an approach that draws from two disciplines, behavior analysis and generals systems theory
- asserts that knowledge from both disciplines is important for practical work because
    - behavioral knowledge about how each person will act within a specific environment and
    - general systems knowledge about how organizations and other living systems function

  is essential in today's complex world
- describes B = f (O, E) as the fundamental concept of the biological, social, and physical sciences, psychology, and general systems theory.

Part II provides a way to analyze any activity into 3 essential components, using the 3 term contingency. The 3 term contingency is the smallest meaningful unit for analyzing individual performance. Part II then describes three different service models used by successful consulting firms. Each firm, in a different way, helps managers apply the 3 term contingency and associated principles within business environments.

Part III describes the smallest meaningful unit for managing organizational performance, the adaptive system. The adaptive system concept is the basis of the total performance system diagram that shows the 7 essential components of an adaptive system. If any one of the 7 components is weak or missing, intelligent performance is very difficult or impossible.

Part IV begins with a concept from general systems theory that helps keep business concepts in perspective. It then introduces 3 additional general systems concepts that can help executives (and behavior analysts) understand why long term success for any organization in a changing world requires managing it as a whole, not as a collection of separate parts.

Introduction

The wife of a business owner told me recently, "My husband can manage any part of the business very well. He can manage anything about the business. But what he can't do is manage everything all at once!" She understood the problem, having run a business herself. But neither she nor her husband knew what to do about it.

The problem is common. When I first met the owner of Ronningen Research and Development almost 20 years ago, he could do every job in the company. He could run

every machine, do the computer assisted design and computer aided manufacturing, repair the furnace, and sweep the place. He could walk through the plant and sense whether it was functioning well or whether something had gone wrong or was about to. And he could manage it effectively. The only problem was that he could manage it only by means of his personal expertise. He had to be there and put in long hours every day, week by week, month by month, year by year. He and everyone in the plant knew that Jon could do anything; the difficulty was that he could not do everything. His wife and his banker worried that if he kept going as he was he would kill himself; the business would die with him.

The next set of concepts from general systems theory help understand why it is necessary to manage everything at once and how to do it without superhuman effort.

Fundamental Concept Four—Value Set

Any living system survives by maintaining a small set of variables, each within a narrow range. For example, a person becomes ill or dies if blood pressure is too high or too low, blood sugar level is too high or too low for too long, temperature is too high or too low, etc. There are a few more such as pH levels, but the point is that there are only a few major vital signs. A business also has a small number of value set variables that must be maintained within a narrow range. The variables include cash flow, income-expenditure balance, indicators of customer relations, and the like.

These essential variables are called value set variables, for obvious reasons. The value set concept is quite important because maintaining the variables is, literally, a matter of life or death for a person or an organization.

The value set concept is important for another reason. It enables us to focus our efforts to understand or manage the system. Deal with value set variables first! When I first began studying organizations, I was struck by the complexity, by the number of variables I could look at, by the number of different views about what is important in any specific organization. I was absolutely amazed by the amount of information a business owner or senior executive might have and by the gaps in their knowledge. Fortunately for me, a very wise manager in Fortune 100 corporation explained to me that business was really quite simple. "We make things," Art Main said, "and we sell things. Everything else supports those two processes." Art's wisdom helped me learn that there may be a lot of confusion within an organization but there are only a few value set variables that must be managed carefully.

The value set concept provides a rationale for a concept that is hot topic in the business press right now, the balanced scorecard. I hope it continues to be a hot topic. Business scholars have long pointed out that, while the financial measures such as profit margin and return on investment are very important, they are not the only important measures. Kaplan and Norton (1966) describe a tool, the Balanced Scorecard, that can help enormously in keeping the most important Value set variables in balance and in focus.

Fundamental Concept Five—Homeostasis

The concept of homeostasis is very closely related to the concept of value set. The value set concept is that there are a small number of variables that must be kept within narrow ranges in order for an O (plant, animal, person, organization) to survive. The concept of homeostasis is based on the observation that all biological systems have mechanisms to regulate value set variables, i.e., keep them from changing very much. The term comes from two Greek words, homeo (similar) and stasis. My *Random House College Dictionary* defines stasis as: "a state of equilibrium or inactivity caused by opposing equal forces." Living systems survive by balancing opposing forces. Living systems are dynamic systems, not static. Living systems work at all times to balance multiple opposing forces to maintain value set variables.

Homeostasis was one of the most talked about concepts in general systems theory in the 1960s as scientists began noticing that all biological systems have homeostatic mechanisms. Yet those of us who seek to bring about change in people or organizations find it vexing that people and organisms resist our efforts. It is tempting to think that something is wrong with "them" when "they" resist benevolently intended efforts; however, balancing opposing forces is a necessary and natural phenomenon. I've come to believe that if I do not encounter "resistance" it is because I am working on something quite unimportant or performing so incompetently that my efforts do not have to be resisted.

Homeostatic mechanisms are so valuable that engineers build them into every complex piece of equipment they build. There are thermostats in my house and car to regulate temperature. The checks and balances built into the federal government can be thought of as homeostatic mechanisms; we see them in action every day in the news.

The existence of homeostatic mechanisms is not a "hot news." Homeostatic mechanisms are so well known that it is easy to forget how important they are. One of the most important things I learned from one of my graduate school professors, S.S. Stevens, is "Never ignore the obvious!" It takes a Harvard professor to point out something that basic. Without his authority I might not have had the courage to write about fundamental concepts rather that a current hot topic.

Fundamental Concept Six—Interconnectedness

The sixth concept is also obvious, up to a point. It is the concept of interconnectedness which is, simply, that within a system everything is connected to everything else. Every value set variable is connected in some way to every other value set variable. Everything done in a system has ripple effects.

Interconnectedness also means that the system is connected to many other systems. The reading clinic was connected to other parts of the Bureau of Psychological Services (through the budgeting process), to all the colleges within the university and all the public schools in the area (through referral networks), to the larger community (competing with

commercial speed reading courses), to several professions (through allegiance of staff members), and to several academic departments (in which staff members earned advanced degrees.) One of the things that amazed me when I became Chief was how everything I did rippled throughout the clinic and throughout the community. Homeostatic mechanisms within the clinic, within the university, and within the community constrained my ability to lead. It took me quite a while to figure out that was a good thing.

The fact that everything is connected to everything else in a system has many implications. I will mention only a few of them:

- Any person or organization operates in a multiple consequence environment. Each thing I do has multiple consequences; if I devote more energy to project A (a personal/family project), I have less energy to devote to project B (a work project.) Each thing an organization does has multiple consequences; energy devoted to project A (launching a new product or service) is not available for project B (continuous improvement of an existing product or service.) For both persons and organizations, multiple 3 term contingencies are always in effect, both internally and externally.
- Some contingencies are rapid-acting; some are slow-acting. Both rapid-acting and slow-acting are extremely important in business and in life. This point is best illustrated in terms of proximate and ultimate causes or effects. A proximate cause is an immediate, closely connected event. For example, the proximate cause of most people's death is heart failure. The heart stops and they die—but what causes the heart to stop? In my father's case, it was loss of blood due to injuries suffered during a fall. What caused the fall? He was weakened by cancer and his most recent treatment. What caused the cancer? Many things, including life-style variables, age, genetics, and an injury that lowered my father's natural resistance, giving the cancer opportunity to grow. What caused my father's death? The death certificate listed the proximate causes, the hemorrhaging from caused by the fall and the weakened state due to cancer. consequence.
- Attempts to find THE cause of anything are doomed: the cause of a disease, the cause of a drop off in sales, the cause of low morale, the cause of high sales, the cause of high morale, the cause of an accident, the cause of a crime, the cause of anything. For example, if sales at the local hardware store fall off dramatically, what is the cause? The proximate cause might be unusually cold weather but there are multiple variables involved, the ultimate causes. Attempts to track down the "ultimate" causes demonstrate that a) some of the slow-acting variables are very difficult to pin down, b) no event has a single cause, and c) no action has a single effect.
- Managers (of anything—health, businesses, teams, mutual funds) must attend to both rapid-acting and slow-acting consequences. That can be done only by attending to trends in many different variables, including value set variables.
- Simple solutions do not work.

The concept of the living system is fundamental to behavioral systems analysis or any practical work in organizations. The concept is simplicity itself: we work with living systems. Every person and every organization, every client and every supplier, every governmental and every stakeholder organization is a living system. This point is made clearly and in great detail in James G. Miller's superb book, *Living Systems*.

Giving the ultimate definition of "living system" is exactly as difficult as giving the ultimate definition of life. Rather than attempt the ultimate definition, I offer a practical definition. A living system is anything with these specific characteristics:

1. It has a reasonably definable value set.
2. Value set variables are homeostatic.
3. It is dependent upon an external environment for its survival.
4. All its actions are interconnected and multiply caused.

If we are to understand what we are doing when we seek to help a person or organization, we must treat the O as a living system, interacting within a life-sustaining and life-threatening E. Because that is the nature of the O. Even if we do not know it and take it into consideration, O is a living system. Making O "better" requires making O function better as a living system. Attempting to manage O as if it were an entity that bends to one's will does not work well; it is a root cause of much human suffering. Effective management requires something that we are only now beginning to understand and do effectively: manage an organization as a system.

Seven Lessons Learned

Please allow me to summarize the broad implications of the fundamental concepts.

1. O cannot survive without E
2. O has functional and dysfunctional behaviors; my job is to support increases in functional and decreases in dysfunctional
3. I must fully understand E if I am to know what is functional and dysfunctional
4. E typically does not have switches and knobs designed for convenient adjustment of E variables to improve O's performance; the switches and knobs must be constructed
5. O is complex; E is complex; interactions between them are complex; the complexity must be captured by a simple and powerful theory and managed by a powerful technology
6. Behavioral systems analysis had to be invented to provide
    a. A theory related to both fast-acting and slow-acting contingencies
    b. A technology that supports intelligent application of the theory
7. The technology had to be intelligent rather than prescriptive (living systems must adapt or die in a changing world)

The seven lessons learned summarize much of what we learned in identifying and applying the fundamental concepts.

Conclusion—an invitation to think

1. What does the concept of interconnectedness suggest to you about efforts to find the cause of cancer? About finding a "magic bullet" for any real and important problem?

2. What important-to-you topic or issue would the value set concept help you understand?

3. What does the concept of homeostasis suggest to you about the resistance to change? When is resistance to change good? When is resistance to change harmful? How can you or anyone else tell the difference between when it would be helpful and when it would be harmful?

4. What is the practical importance of knowing that both fast-acting and slow-acting variables are important?

Part V describes cutting edge applications that apply the fundamental concepts, the theory, and use the technology of behavioral systems analysis.

References

Kaplan, R. & Norton, D. (1996). The Balanced Scorecard: Translating Strategy into Action. Cambridge, Mass: Harvard Business School Press.

Miller, J.G. 1978. *Living Systems*. New York: McGraw-Hill.