DYNAMICS OF THE JOHARI WINDOW: A SIMULATION

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ABSTRACT

A simulation of the dynamics of management behavior through the Johari Window is studied. A mathematical model is developed utilizing the concepts of Markov chains. Strategies for behavior modification are simulated. Results are presented which show that information flows between panes of the window and by interacting with barriers between panes, desired changes can be effected.

INTRODUCTION

In recent years cybernetics has been of growing concern to individuals involved with the management of people. Many of the early applications of cybernetics were of physical systems but more and more attention has been given lately to the social and behavioral sciences. The works of Ashby, Beer and others have presented applications of cybernetics to the fields of politics, economics, sociology and management. (1), (2).

The concept of communication plays an important role in the study of cybernetic systems. Specifically, communication in the form of information transfer between the system, its components, and its environment must be examined. Of particular importance in the study of communication in cybernetic systems is the concept of feedback. In any behavioral system it is through feedback that individuals learn how others see them. In any managerial situation feedback is all important to the accomplishment of desirable objectives. There are many times, however, when barriers to communication exist which impede the feedback process and prevent objectives from being met. Several management models have been developed to help managers analyze themselves and their subordinates and to effect desirable changes. The managerial grid helps to determine and describe managerial behavior, (4) transactional analysis enables a manager to initiate change through awareness of self and others, (3) and the Johari Window is a model for viewing relationships and interactions among individuals in group situations. (5).

While the managerial grid and the Johari Window allow us to view a manager or individual at an instant in time, cybernetics suggests that a dynamic situation involving feedback should be studied so that a manager could initiate desirable changes either in himself or in members of a group. This paper utilizes properties of Markov chains to examine the dynamic aspects of the Johari Window. A mathematical model is presented which will enable a manager to determine which communication barrier will most change an individual in a desired direction.

JOHARI WINDOW

The Johari Window concept of "self" is shown in Figure 1.

FIGURE 1

Johari Window Concept of Self Individual

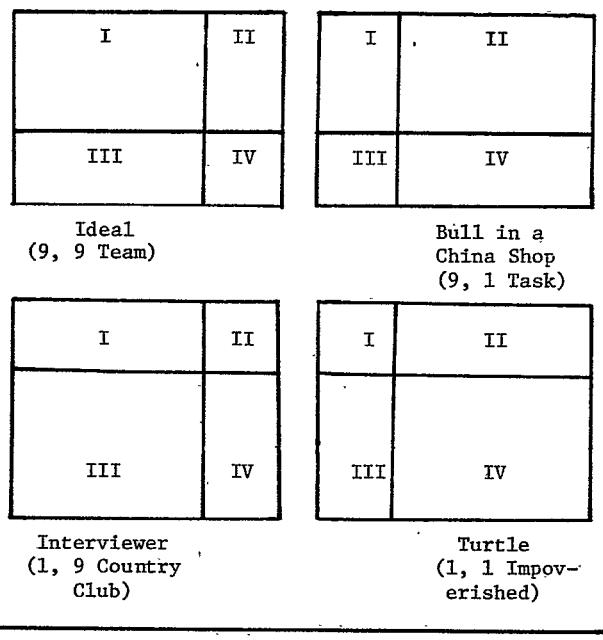
	Known to Self	Not Known to Self
Known to Group	I Arena	II Blind
Not Known to Group	III Facade	IV Unknown

Pane I (Arena) contains information that is known to both the individual and the group and is characterized by an open exchange of information. The size of this pane increases as transactions occur and more information is released from other panes. Pane II (Blind) contains information known to the group but not to self. As time passes, some information is transmitted through cues of which the individual has no knowledge. The size of this pane is an indication of the degree that feedback is given or accepted. Pane III (Facade) contains information that is being withheld from the group. As trust develops, information will flow from this pane to the arena. Pane IV (Unknown) contains information unknown to both the individual and the group. This pane may contain things such as interpersonal dynamics, latent talents and unrecognized inner resources. Through the feedback process some of this information will transfer to the Facade and Blind areas as some things become known to the individual while others become known to the group.

As transactions occur information is transferred into and out of various panes. A study of this transfer may help to develop ways to break down some of the barriers which restrict free transfer of information. Ideally, the arena should be the largest pane of the window but many times the opposite is true. A similar analogy exists in the managerial grid. Most individuals would prefer a 9, 9 or team oriented manager (Ideal Johari Window type) but many times are supervised by a 1, 1 or impoverished manager (Turtle type) which is illustrated by a Johari Window with a large unknown pane. Figure 2 shows four configurations for the Johari Window with corresponding managerial grid values.

FIGURE 2

Johari Window Configuration for Various Management Styles



Obviously, not all individuals or managers have a management philosophy depicted by a 9, 9 on the managerial grid or Ideal configuration in the Johari Window. It is important then to attempt to break down the barriers between the various panes in order to increase information transfer to the arena and in so doing move closer to a 9, 9 management philosophy or, given a particular set of requirements, any other desired management philosophy. As many studies have pointed out, it may be just as imperative under certain circumstances to act as a 9, 1 or other type of manager. For example, given that an individual is a 1, 1 manager or possesses Turtle characteristics the question arises as to whether that person can be helped to trust more in the group and transfer information from the Facade area to the Arena, thereby increasing the size of the arena and moving in the direction of the 9, 9 or Ideal type. It might also be possible as the group works with an individual over time that the individual can be encouraged to release information from the unknown area to the group which can then be eventually transferred to the Arena. For each of the three non-ideal types of individuals varying approaches should probably be used in order to facilitate this information transfer in the most judicious manner. A study of the rates of feedback which will effect desirable changes should illustrate which barriers to first approach in order to encourage desired changes. Following is a mathematical formulation which can be used to add insight into the dynamic aspects of the Johari window over time.

THEORETICAL DEVELOPMENT

The development of this model assumes that no new information is introduced into the system during the time frame being simulated, and that there are definite time increments (transactions) during which information transfer occurs at a rate of λ_{ij} at each time increment. λ_{ij} is defined to be the proportion of pane i that is transferred to pane j at any increment in time. These two assumptions should not impose any undue restrictions on the overall outcome of the analysis. The assumption that new information is not introduced during the time frame being considered should not be of critical importance. Initially, the window contains all information that is currently available whether known or unknown. Compared to the whole, any new information that might possibly become available over a relatively short time span will most likely be small in proportion to the entire body of knowledge concerning the individual. A time increment can be looked upon as a specified time period such as an interview period, a group session or an encounter.

The transitions during each increment can be formulated as follows:

		To Frame (j) at Time t+1			
From Frame (i) at Time t		I	II	III	IV
	I	1.0	0	0	0
	II	λ_{21}	$(1-\lambda_{21})$	0	0
	III	λ_{31}	0	$(1-\lambda_{31})$	0
	IV	0	λ_{42}	λ_{43}	$(1-\lambda_{42}-\lambda_{43})$

Since the λ_{ij} are constant they are independent of the time increment and may be viewed as a Markov process since:

$$P\{X_{t+n} = j \mid X_t = i\} = P\{X_n = j \mid X_o = i\}$$

for all $t = 0, 1, \ldots$

Which states that the probability of being in state j at some point in time given that the system was in state i at some earlier time is the same as the probability that the system is in state j at time n given that it was in state i at time 0. These conditional probabilities can be denoted by $\lambda_{ij}^{(n)}$ and are n step transition probabilities. Therefore, $\lambda_{ij}^{(n)}$ relates to the size of panes i and j after n transactions.

Since the $\lambda_{ij}^{(n)}$ are conditional transfer rates they must satisfy the properties:

$$\lambda_{ij}^{(n)} \geq 0 \quad \text{for all i and j and n = 0,1,2...}$$

$$\sum_{j=0}^{4} \lambda_{ij}^{(n)} = 1 \quad \text{for all i and n = 0,1,2...}$$

The information transfer system is an example of a finite state Markov chain since (a) there are a finite number of states, (b) it has the Markovian property, (c) it has stationary transition probabilities, and (d) it has an initial set of probabilities $P(X_0 = \P_0)$ for all i..

It can be noted from the transition matrix that $\lambda_{11} = 1$ and, therefore, by definition is an absorbing state. This implies that given enough time all information concerning an individual that was originally available will eventually be absorbed by the Arena and become information known to both the individual and the group. In reality, this theoretical absorption phenomenon probably cannot be achieved. However, it indicates that progress can be made and attempts can and should be made to remove the barriers and allow feedback to cause the flow of this information with the net result that a management style change can be effected.

Now that the system has been formulated as a Markov process, the changes in size of the panes of the window can be viewed over time. These size changes will give us insights into the dynamic aspects of management behavior. It is also important to be able to examine the changes in the entire system as well as changes to individual panes. A measure of the system changes will better illustrate the overall effects of the feedback and learning process.

SIMULATION

The simulation allows us to examine any of four strategies.

(a) Impose no outside influence - this strategy is the no-change condition in which the λ_{ij} will remain constant over the simulated time interval.

(b) Influence pane i=1, 2, 3 for n_j transactions, j=0, 1, 2,...This is a limited strategy which corresponds to the condition that takes into account the situation in which it is not realistically possible to measure the individual type after each transaction. This strategy will allow us to simulate the condition in which additional attention will be focused on one or more of the barriers between panes in order to increase the information transfer and therefore move the individual toward a desired type. For example, in order to move an individual who is of the Interviewer type with a large Facade pane containing information withheld by the individual from the group, if the individual can be made to trust more in the group that person will then transfer information from this area to the arena area. This will result in a net increase in λ_{31} the transfer rate between panes three and one.

(c) Influence the pane with the greatest amount of information at each transaction. Intuition dictates that this may be the strategy that will move an individual in a desired direction the fastest. However, this will depend greatly on the effects of the information transfer rate at each transaction.

(d) Employ a variable strategy. With this strategy the simulation chooses the pane to influence at each transaction and then the transfer rate is determined by sampling from a normal distribution with mean and standard deviation set by the user.

For a particular strategy, the simulation of the information transfer rate is based on the following model:

$$\lambda_{ij}^{(n+1)} = \lambda_{ij}^{(n)} + \alpha_{ij}^{(n+1)} f_{ij}(I+) - T_{ij}^{(n+1)} g_{ij}(I-)$$

where:

$\lambda_{ij}^{(n+1)}$ = the information transfer rate at transaction (n+1)

$\lambda_{ij}^{(n)}$ = the information transfer rate at transaction n

$\alpha_{ij}^{(n+1)}$ = the probability of effecting a positive change in the information transfer rate at transaction n+1

$f_{ij}(I+)$ = the function of positive transfer rates which may be simulated using a specified distribution such as constant, normal, Poisson, exponential, etc.

$T_{ij}^{(n+1)}$ = the probability of effecting a negative change in the information transfer rate at transaction n+1

$g_{ij}(I-)$ = the function of negative transfers. This term allows us to stimulate the condition that the transfer rate could actually decrease as a result of outside influence.

This model allows us to stimulate the condition that exists when additional pressures and influences are applied to an individual. The individual's willingness to transfer information may be positively influenced: the person will "open up" and provide feedback or the individual may be negatively influenced, "close up" and be even less inclined to provide feedback.

In order to run the simulation the user must first specify a seed value for the determination of random numbers. An initial individual type must be specified for typical management grid styles corresponding to Johari window types.. For example,

the simulation can be run for types presented in the "Annual Handbook for Group Facilitations," which are (1) 1,1 Impoverished - Turtle type, (2) 1,9 Country Club - Interviewer type, (3) 9,1 Task Oriented - Bull in a China Shop type and (4) 9,9 Team Oriented - Ideal type. In addition any other initial window pane sizes can be set by the user. The λ_{ij}, the no influence information transfer rates must be specified. The assumption here is that in the normal course of group interaction there will be a determinable amount of information transfer taking place without any outside intervention. These transfer rates will be between 0 no changes, to 1 complete change. In practice these λ_{ij} are measurable learning rates which correspond to those measured in classical learning theory. In addition to these specifications, a mean aid standard deviation for the information transfer rates must be specified if the variable strategy is to be used.

RESULTS

The simulation can be used to examine changes over time in sizes of the panes of the Johari window for varying feedback rates using the models of the Turtle, Bull in a China Shop and Interviewer. Table 1 shows changes in size of the panes of the windows for each of the types previously mentioned for n=20 transactions under the no influence strategy. Information transfer values of $\lambda_{21} = .05$, $\lambda_{31} = .05$, $\lambda_{42} = .05$ and $\lambda_{43} = .05$ were used.

TABLE 1

Window Pane Size Changes Over Time: No Influence Strategy

Type	Transaction	Pane			
		Arena	Blind	Facade	Unknown
Turtle	0 (Initial)	.050	.100	.100	.750
	5	.127	.215	.215	.443
	10	.244	.247	.247	.262
	20	.482	.214	.214	.091
Bull in a China Shop	0 (Initial)	.050	.750	.100	.100
	5	.247	.599	.096	.059
	10	.406	.474	.085	.035
	20	.636	.293	.060	.012
Interviewer	0 (Initial)	.050	.100	.750	.100
	5	.247	.096	.599	.059
	10	.406	.085	.474	.035
	20	.636	.060	.293	.012

Table 2 incorporates the Step Change and Greatest Information Strategies. In this simulation the value of λ_{ij} for the pane containing the most information was set at .10. Changes were made at 5 step intervals.

TABLE 2

Step Change/Greatest Information Strategy

Type	Transaction	Pane			
		Arena	Blind	Facade	Unknown
Turtle	0 (Initial)	.050	.100	.100	.750
	5	.127	.215	.215	.443
	10	.252	.239	.312	.197
	20	.593	.150	.189	.069
Bull in a China Shop	0 (Initial)	.050	.750	.100	.100
	5	.247	.599	.096	.059
	10	.517	.363	.085	.035
	20	.795	.133	.060	.012
Interviewer	0 (Initial)	.050	.100	.750	.100
	5	.247	.097	.627	.066
	10	.473	.087	.401	.039
	20	.804	.060	.174	.012

Table 3 presents results of a variable strategy model in which the mean is set at .05 for each λ_{ij} with a standard deviation of .167.

TABLE 3

Variable Strategy Model

Type	Transaction	Pane			
		Arena	Blind	Facade	Unknown
Turtle	0 (Initial)	.05	.10	.10	.75
	5	.185	.197	.170	.447
	10	.294	.271	.148	.287
	20	.529	.256	.140	.075
Bull in a China Shop	0 (Initial)	.05	.75	.05	.10
	5	.252	.596	.120	.032
	10	.544	.344	.097	.015
	20	.728	.211	.056	.005
Interviewer	0 (Initial)	.05	.10	.75	.10
	5	.485	.063	.398	.053
	10	.529	.048	.404	.018
	20	.684	.037	.270	.009

DISCUSSION

Tables 1, 2 and 3 illustrate the dynamic nature of the Johari Window for the Turtle, Interviewer and Bull in a China Shop types of individuals. Table 1, the no influence strategy, shows that if there is any information transfer it will work towards increasing the size of the arena. For the Turtle, the arena size is increasing at a slower rate. This is due to the fact that initially there is a large pane of unknown information that must first be transferred to the Facade and Blind areas before flowing to the arena. Since there is more

known initially concerning the Bull in a China Shop and Interviewer types; the arena increases at a faster rate. An individual of the Turtle type, then, under similar conditions will require a longer period of time to move toward the Ideal type than the others. Table 2 shows how outside influence can be exerted to increase the rate of information transfer to the arena. These results show the effects of an outside influence which could be in the form of a training program, individual conference, etc. that can help break down the barriers to communication and encourage an individual to change. In fact the simulation shows that changes will occur the fastest when the barrier around the pane containing the greatest amount of information is influenced. The simulation resulting in Table 3 is an attempt to present a more realistic view of the Johari Window concept. Using the parameters of this model a researcher can incorporate observed learning rates with appropriate standard deviations and then study the simulated results in order to determine the barrier which is most important to the objective of interest. Using the simulation can help a researcher plan strategies to change an individual's attitudes and in the process help to make him a better manager.

CONCLUSIONS AND IMPLICATIONS

This study has attempted to show some of the dynamic characteristics of a manager's behavior over time in group situations. As seen from Table 1, given constant rates of information transfer, over time information will flow to the area which is information known to both the individual and the group. This fact is true for all conditions except when the information transfer rates are zero between each pane. The major implication in this result is that an individual can be moved in the direction of a desired management style through an interaction process between panes of the manager's window and information flow can be increased by breaking down some of the factors that cause the barriers between panes. For a Turtle type the barriers of importance are between the Facade/Arena and the Blind/Arena. This result is interesting in that intuition would dictate the barriers around the Unknown would be most important since it is by far the largest pane. For the Bull in a China Shop and Interviewer types major changes will result if the Blind/Arena and Facade/Arena barriers are respectively broken.

These results along with those presented in Tables 2 and 3 point to the formulation of strategies for meeting specific management objectives.

BIBLIOGRAPHY

1. Ashby, W. R. Introduction to Cybernetics. Wiley, New York, 1963.
2. Beer, S. Cybernetics and Management. Wiley, New York, 1964.
3. Berne, E. Games People Play. Grove Press, New York, 1964.
4. Blake, R. R. and J. S. Mouton. The Managerial Grid. Gulf Publishing Co., Houston, 1964.
5. Luft, J. The Johari Window: A Graphic Model of Awareness in Relations. National Press Books. Palo Alto, CA, 1970.
6. Pfeiffer, J. W. and J. E. Jones, Ed. Annual Handbook for Group Facilitators 1973. University Associates. Sandiego, CA.