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An Attempt to Predict Behavior: How Does organizer of Mindamic Generate ‘ Causalities ’ in Interaction

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Abstract

The rearch is a sequel to former attempts to inquire dynamic of the mind or mindamic with probability theory. Other types of information was dealt with, formerly. So the turn was that of social information. It was assumed: How does organizer of mindamic generate ‘causalities’ in interaction? The subjects were 259 persons; 166 were men and 93 women. The age of persons varied from 18 to 72 years. The data were obtained from the videotapes of 37 sessions with a set of the observation categories. The statistical analysis comprised of the Bayesian probabilities, and the application of the chain rule of the matrix calculus. The results indicated an alternation between the dynamic causes in the organizer of the persons and the overt behavior. The tightness of the most probable causes generate inhibition of the overt behavior. The looseness of the causes in the organizer generate more frequent overt behavior such as the evasive behavior, the rewarding behavior, the straightforward behavior, and the annulment of the former behavior.

An Attempt to Predict Behavior: How Does organizer of Mindamic Generate ‘Causalities’ in Interaction

The research is a sequel to former attempts to inquire dynamic of the mind or mindamic with probability theory. However, during last 10 years the focus of the research has changed from the mind processes and their causes to the organizer of the mindamic. It might be difficult to cope with environment without some kind of organization in the mind. Different kinds of information persons deal with have been under scrutiny but social information, more exactly, person perception is open. In the research the deficiency is mended, at least, partly. A problem lyis in a fact that an explained organized body of knowledge is not available. Therefore, it is profitable to do a hypothesis in a form of a question. How does organizer of the mindamic generate ‘causalities’ in interaction? Environmental information processes in the mind and behavior is to match with environment as overt behavior, an organization(s) is neeedful. The organization evolves in the mind. Consequently, it is assumable

that the organizer produces overt behaviors. Interaction does not take place in void but with an immediate social environment or with other persons in sight. So it is consistent to assume that the most probable causes are born in interplay between the organizer and the immediate social environment. A suitable frame work is: Input from the immediate social environment—Processing in the organizer—Overt behavior as an output.

Behavioral categories functioned as device for observation from videotapes. Statistical analysis comprised of an application of Bayes formula and elementary matrix calculation. A similar kind of technique as higher order transitions in Markov chains was applied to finding changes of causalities during mindvals.

Shortly, the background variables were gender, age, job, and hobbies. The categories for the organizer were scan, order, association, modification, and specification. The categories of the overt behavior included reinforcement, extiction, punishment, avoidance, and approach.

Method

Subjects and Data gathering

The subjects were 259 persons participating in a contest where social information was the only one needed. The data were obtained from 37 half an hour sessions which included in six interactive occasion with situations. No time interval of observation existed. Observation took place freely and the adequate responses fitting the set of categories were tallied in the observation forms.

Categories of Observation

The categories for the organizer were. A person 1) scans, observes in detail 2) orders, enumerates action 3) associates, refers to former/previous action 4) modifies, changes action of the same matter 5) specifies, focuses action to a particular point. The overt behavior categories were. A person 6) reinforces, action that rewards previous/former behavior 7) extincts, action that induces changes in decisions 8) punishes, annuls previous/former behavior 9) avoids, behaves evasively 10) approaches, behaves straightforwardly.

Reliability and Validity of Observation

The data included in over 6000 single

observations. Therefore, it was rational to double random sample the data for the reliability and validity of observation. First, the number of the sessions(1-37) were randomized and then the randomized order was fifty-fifty randomized. After that the queues were multiplied that resulted in 13 sessions for assessing the reliability and validity from the matrix of all the category frequencies. The discrete time was in the columns.

Corelations were calculated between the columns. The correlations in the matrix were squared. A procedure that resulted in common variances in the off-diagonal cells when nulls replaced the ones in the diagonal cells. Application of the formula (Nunnally, 1967, p. 195,6-23)to the common variance matrix minus the diagonal sum of the ones gave a value of 0.94 for the coefficient of reliability of observation.

On the contrary, a validity measure was a more complex one. The question was much about: are the frequencies in the categories where they are to be. So the maximum differentiation between the categories

is then when the correlation are nulls and the coefficients of alienation are ones.

At first, the correlations were calculated between the categories. Thereafter, the sums of the negative and positive coefficients were calculated. From the positive sum was subtracted the sum of negative values. The difference was divided by the number of 110 which is the maximum sum of the off diagonal alienation coefficients. The resulted quotient indicates the overlap between the frequencies in the categories. The obtained value was 0.086. Thus the categories are separate enough.

Results

Statistical Analysis

The scan of the leader was the prevailing mode of behavior and in the columns of the frequency matrix the behavior is about constant. The constant behavior does not affect the entire sequence of the occasions. So that the behavior of the leader was eliminated. Some categories included in small frequencies and they were deleted. The categories were : associates, modifies, specifyis, reinforces, extincts, punishes, avoids, and approaches.

Table 1

Start Frequencies for Statistical Analysis

	Discrete time					
Leader	t^1	t^2	t^3	t^4	t^5	t^6
Scans	494	450	455	442	378	345
Orders	1	1	1	1	1	1
Associates	1	3	1			
Modifies	5	3	1	3	1	
Specifies	1	1	4	2	1	
Subject						
Scans	24	8	7	7	6	
Orders	9	9	13	13	13	5
Associates	60	54	48	50	47	11
Modifies	45	41	43	45	37	11
Specifies	96	85	86	100	90	33
Reinforces	237	217	217	233	193	144
Extincts	4	8	5	5	4	7
Punishes	113	105	97	99	77	78
Avoids	70	63	69	59	60	61
Approaches	163	162	154	148	152	112

Table 2

Distribution of Background Frequencies (N=259)

Variable		f
Gender		
	Men	166
	Women	93
Age	18-28y	111
	29-39y	92
	40-50y	40
	51-61y	13
	62-72y	2
Job		
	Mental	199
	Mental-physical	48
	Physical	10
Hobbies		
	Mental	72
	Mental-physical	123
	Physical	64

There are 3 missing information in Table 2; 1 is in the age classification and 2 in the job classification. In a statistical sense they do not have a greater meaning.

Construction of Causal Matrix

In every occasion a drop out of a person took place. Furthermore, the persons have expectations about future events. The means of the utilized frequency matrix were calculated in the rows. The means were as the expectations at time zero. The drop out of a person demanded on weighting of the frequency matrix from the expectations to the last interaction occasion. The number of the persons in each occasion was divided by the start number of 7 persons, the expectation included. It resulted in a probability vector by which the frequency matrix was multiplied at time.

The framework of the analys Input—Process—Output presumed picking up disrete time permutations among the measurements such as (0,1,2), (1,2,3), (2,3,4), (3,4,5), and (4,5,6). Second the figuring out the most probable causes in the subprocess of the midamic demanded on two level probabilities, the elements and

the events. The relative frequencies in the weighted frequency matrix converted into probabilities. The event probabilities converted from the cumulative probabilities at time. However the start set does not empty so the last columns of the submatrices are not filled with ones.

In the place of the input it was unnecessary to calculate the event probabilities. The event probabilities were calculated for the process and for the output. The following connections formed from the procedure: Input->Process; Process->Process; Process->Output or Overt behavior->Organizer; Organizer->Organizer; Organizer->Overt behavior. The Bayes formula in a matrix form was the device for the connection. The obtained connection matrices were one-to-one multiplied and put into a stochastic form. The chain rule with the transposes of the matrices was applied to the former time order of the framework.

The next task was to arrange a stochastic matrix where the overt behavior, the organizer, and the behavioral output locate in the adequate places. A 7 by 7 matrix was the result with nulls in the

in the cells between the overt behavior and the behavioral output of the same categories. The nulls were for the sake of no direct influences because of the organismic processes.

The background vector of the frequencies and their relative frequencies converted into probabilities of the system vector. The system probabilities and the start matrix are in Table 3.

The procedure of the Markovian higher step transition was adopted to define mindvals or the intervals in the mind time. A closer conceptual examination is going to take place in the conlusion section. So the causal matrix was powered til the 6th power because of the 6 occasions of interaction. The chaining of the system vector and the matrix powering took place with the Markov chain, analogously. The approch offered an advantage to deal with dynamic causes instead of the static ones included in a machinery angle of view. The chages of the system vector and of the causal relations are readable through Tables 4-8. Alternations

Table 3

Probabilities of System Vector and Causal Matrix

System variable

M	W	18-28	29-39	JM	HM	HMP
.193	.108	.129	.107	.232.	.084	.143

Causal matrix

	Ass	Mod	Spe	Rei	Pun	Avo	App
Ass	.161	.169	.169	.126	.121	.127	.123
Mod	.161	.169	.169	.126	.121	.127	.123
Spe	.161	.169	.169	.126	.121	.127	.123
Rei	.328	.334	.336	.000	.000	.000	.000
Pun	.327	.334	.337	.000	.000	.000	.000
Avo	.327	.334	.337	.000	.000	.000	.000
App	.328	.334	.337	.000	.000	.000	.000

Note. The abbreviations in the table are: M=men, W=women, 18-28 and 29-39 are the age groups, JM= mental job, HM=mental hobbies, and HMP=metal-physical hobbies.

Ass=associates, Mod=modifies, Spe=specifies, Rei=reinforces, Pun=punishes, Avo=avoids, and App=approaches

Table 4

Causalities in Second Mindval

System variable at t^1

M	W	18-28	29-39	JM	HM	HMP
.256	.2363	.264	.054	.052	.055	.053

Second mindval

	Ass	Mod	Spe	Rei	Pun	Avo	App
Ass	.244	.251	.253	.063	.060	.063	.061
Mod	.244	.251	.253	.063	.060	.063	.061
Spe	.244	.251	.253	.063	.060	.063	.061
Rei	.161	.169	.169	.126	.121	.127	.123
Pun	.161	.169	.169	.126	.121	.127	.123
Avo	.161	.169	.169	.126	.121	.127	.123
App	.161	.169	.169	.126	.121	.127	.123

Note. The abbreviations in the table are: M=men, W=women, 18-28 and 29-39 are the age groups, JM= mental job, HM=mental hobbies, and HMP=metal-physical hobbies.

Ass=associates, Mod=modifies, Spe=specifies, Rei=reinforces, Pun=punishes, Avo=avoids, and App=approaches

Table 5

Causalities in Third Mindval

System variable at t^2						
M	W	18-28	29-39	JM	HM	HMP
.226	.234	.235	.077	.073	.077	.075

Third mindval						
Ass	Mod	Spe	Rei	Pun	Avo	App
.203	.210	.211	.094	.091	.095	.092
.203	.210	.211	.094	.091	.095	.092
.203	.210	.211	.094	.091	.095	.092
.244	.251	.253	.063	.060	.063	.061
.244	.251	.253	.063	.060	.063	.061
.244	.251	.253	.063	.060	.063	.061
.244	.251	.253	.063	.060	.063	.061

Note. The abbreviations in the table are: M=men, W=women, 18-28 and 29-39 are the age groups, JM= mental job, HM=mental hobbies, and HMP=metal-physical hobbies.

Ass=associates, Mod=modifies, Spe=specifies, Rei=reinforces, Pun=punishes, Avo=avoids, and App=approaches

Table 6

Causalities in Fourth Mindval

System variable at t^3

M	W	18-28	29-39	JM	HM	HMP
.215	.223	.223	.085	.081	.086	.083

Fourth mindval

	Ass	Mod	Spe	Rei	Pun	Avo	App
Ass	.223	.231	.232	.079	.075	.079	.077
Mod	.223	.231	.232	.079	.075	.079	.077
Spe	.223	.231	.232	.079	.075	.079	.077
Rei	.203	.210	.211	.094	.091	.095	.092
Pun	.203	.210	.211	.094	.091	.095	.092
Avo	.203	.210	.211	.094	.091	.095	.092
App	.203	.210	.211	.094	.091	.095	.092

Note. The abbreviations in the table are: M=men, W=women, 18-28 and 29-39 are the age groups, JM= mental job, HM=mental hobbies, and HMP=metal-physical hobbies.

Ass=associates, Mod=modifies, Spe=specifies, Rei=reinforces, Pun=punishes, Avo=avoids, and App=approaches

Table 7

Causalities in Fifth Mindval

System variable at t^4

M	W	18-28	29-39	JM	HM	HMP
.216	.224	.225	.084	.081	.085	.082

Fifth mindval

	Ass	Mod	Spe	Rei	Pun	Avo	App
Ass	.213	.220	.221	.087	.083	.087	.085
Mod	.213	.220	.221	.087	.083	.087	.085
Spe	.213	.220	.221	.087	.083	.087	.085
Rei	.223	.231	.232	.079	.075	.079	.077
Pun	.223	.231	.232	.079	.075	.079	.077
Avo	.223	.231	.232	.079	.075	.079	.077
App	.223	.231	.232	.079	.075	.079	.077

Note. The abbreviations in the table are: M=men, W=women, 18-28 and 29-39 are the age groups, JM= mental job, HM=mental hobbies, and HMP=metal-physical hobbies.

Ass=associates, Mod=modifies, Spe=specifies, Rei=reinforces, Pun=punishes, Avo=avoids, and App=approaches

Table 8

Causalities in Sixth Mindval

System variable at t^5

M	W	18-28	29-39	JM	HM	HMP
.217	.224	.225	.084	.081	.085	.082

Sixth mindval

	Ass	Mod	Spe	Rei	Pun	Avo	App
Ass	.218	.226	.226	.083	.079	.083	.081
Mod	.218	.226	.226	.083	.079	.083	.081
Spe	.218	.226	.226	.083	.079	.083	.081
Rei	.213	.220	.221	.087	.083	.087	.085
Pun	.213	.220	.221	.087	.083	.087	.085
Avo	.213	.220	.221	.087	.083	.087	.085
App	.213	.220	.221	.087	.083	.087	.085

Note. The abbreviations in the table are: M=men, W=women, 18-28 and 29-39 are the age groups, JM= mental job, HM=mental hobbies, and HMP=metal-physical hobbies. Ass=associates, Mod=modifies, Spe=specifies, Rei=reinforces, Pun=punishes, Avo=avoids, and App=approaches

System variable at t^6

M	W	18-28	29-39	JM	HM	HMP
.217	.224	.225	.084	.081	.085	.082

occur in the subprocess of the process system. A prominent thing is emergence of order in the causalities but the magnitudes of the most probable causes fluctuate. Another thing is the sameness of the causalities of the organizer in the 1st mindval and in the last mindval.

Discussion

The hypothesis was answerable with the dynamic most probable causes. However, auxiliary concepts are necessary before the proper inferrences from the derived data. Earlier, the term mindval was applicable to move in mind time. The mindval is definiable as an experiental interval of time which bases on behavior of persons, occasions, experiences, things, matters or on their combinations. In a simple way, the mind is a process system where processes process processes. So time is inherent in the process system.

In the 1st mindval(Table 3) the persons expect to focus their action to a particular point. If the previous behavior does not realize the persons expect others to change action dealing with the same matter under inspection. If the previous conditions

do not fulfill the persons expect others in sight to refer the former behavior.

In their organizers expectations of the persons are somewhat perplexed because the causal probabilities are the same from the association, the modification, and the specification to the effects of the modification, and the specification. In the same manner the auto-causalities of the modification, and of the specification are similar. The weakest causalities are from the modification, and from the specification to the association. So the persons expect others to modify or to specify their behavior.

On the contrary, the persons organize their overt behavior into a certain order of presentation. The persons generate evasive behavior, they reward the former behavior. After that they behave straightforwardly, and they annul the former behavior, as the last option.

The persons base the action of their organizers on the previous causes and their interaction on the previous overt behavior. The persons store them selectively into the working memory (Table 4). The persons use the previous causalities of the

organizer as an input into the next mindval. The overt behavior is reminiscent.

This time (Table 4) the persons order their causalities in the organizer in a social occasion. The persons specify, modify, and associate, in the very order. The persons cease to expect behavior of others in the 2nd mindval (Table 4) and they transfer to person perception. The persons use their organizers more than previously because the probabilities rise in the organizer.

On the contrary the persons keep their overt behavior in check, considerably and compared with the previous expected output. So the most probable causes in the organizer are firmer but the overt behavior is scarce. Principally, the persons reward or avoid contacts; then they approach. The last alternative is the persons punish others. The differences in the causes are not great but they are clear. How about a significance test? In the same way, the persons advance their previous causes in the organizer transferring to the next mindval. However, the persons slacken their organized causalities, a little bit (Table 5). It is important, the mutual

orders of the causalities stay valid. In spite of the slack the overt behaviors of the persons become more frequent. Now there emrges an order in the overt behavior. The avoidance behavior becomes first, thereafter the reinforcement, third comes the approaching behavior, and lastly, the punisment. The order means behavior where the implementations differentiate according to the realized options.

The previous causalities in the organizer and the reminiscence of the overt behavior repeat themselves in motion to the 4th mindval (Table 6). The person again tighten the organized causalities in the same order than previously. The persons specify foremostly, and then they modify. If neither of the behaviors realizes then the persons refer to the former action. What is significant is the persons reduce their overt behaviors. Actually, they repeat the behaviors in the 2nd mindval but more frequently. Thereafter on, the persons maintain their orders of the overt behaviors.

There occurs small increases in the overt behavior in the 5th mindval (Table 7) and the smallest corresponding decreases in the 6th mindval

(Table 8). Correspondingly, the persons lessen the causal connections of the organizers in the 5th mindval. In the 6th mindval the persons return to the causal relations which occurred during the 1st mindval. The persons loosen the causal orders and they transfer back to a vexed organization of behavior. From the 4th mindval on the persons adhere to their equal avoidance, and rewarding behavior; after that they behave straightforwardly, and annul the former behavior of others in sight.

As with the system vector there occurs a wear off effect. So the changes in the system probabilities indicate the profitable properties, or jobs, or hobbies during the subprocess of the process system. In the 1st mindval it is benficial to belong to the age group of 18-28, to be a woman, and to be a man. In the 2nd mindval the same properties are valid. In the 3rd mindval it is good to be a woman, or 18-28 aged, or a a man. In the 4th mindval the order of the properties is the same as in the 1st and 2nd mindvals. The age of 18-28 years, and being a woman remain valid. in the last two mindvals. A minor increase in being a a man occurs from the 5th

mindval on.

In summary, there occurs alternation between the dynamic causes in the organizer and the overt behavior. The tightness of the most probable causes generate inhibition of the overt behavior. The looseness of the causes in the organizer generate more frequent overt behavior such as the evasive behavior, the rewarding behavior, the straightforward behavior, and the annulment of the former behavior.

In a theoretic sense, social information from the immediate environment(persons in sight) is to be dealt with before responding. Organizing, and behaving overtly are not possible simultaneously. Reducibly, rather the neural activity corresponds to a mental event interposed between the stimulus and the response(Goldman-Rakic, 1993, p. 70). It appears reasonable to assume the organization of the mental processes to evolve together with other ‘routes’ of semantic syntax in the prefrontal cortex. Time is necessary for becoming conscious, too. Thus the alternation takes place between the construction of the organization from the social information and its application to real situations. On the other

hand, the persons get into novel social situations where former experience does not count but the previous experience. So there is the differentiation between the former and previous experiences.

As an entity the results refer to the direction; the order of the dynamic causes evolves rather early in the mind time. No greater changes take place after the emergence of the order. The wear off effect favors the background properties of the persons at the expense of the activies. The previous experience in the subprocess dictates behavior in the next new social occasion.

So its presumable that persons utilize information of person perception at an early stage in social interaction and stick with it in a varying amount. Their overt behavior decreases bacause of high activity in the organizer and the overt behavior increases in the lower activity causal states of the organizer, at mind time. The previous is the most probable guess, at hand.

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