A causal look at the occurrence of biases in strategic change

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Abstract

Information is very important for organizations in deciding whether to change their strategy. Hence, information processing is a fundamental task, which should be done effectively. However, the vast amount of available information coupled with the limited cognitive capabilities make such activities less effective than desired. To reduce mental effort required to collect and analyze information, organizations employ various biases and heuristics. Researchers, both in psychology and strategic decision-making, point out the persistence of biases. Such literature streams, however, mostly pay attention to the occurrence of one bias at a time even though some biases are dependent on each other and occur simultaneously. The proposition of this paper is that the use of biases and heuristics reinforce the factors leading to their use. The importance of this proposition is shown with a system dynamics model by demonstrating that the isolated effects of two biases generate different results than their combined effect.

1. Introduction

There has been an ample amount of attention to psychological biases and heuristics in the literature streams of psychology and strategic decision-making. Various experiments have been designed to show the existence of biases in different decision-making settings. Researchers have devised classifications of biases based on the decision-making stage in which they occur. Empirical work has shown that biases exist and have effects in different stages of decision-making. Yet, the focus has been on individual biases rather than the joint effects of multiple biases occurring simultaneously. The starting point of this work is the assertion that biases are related to one another. They are not independent processes that occur

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in their own account, but their occurrence depends on the occurrence of other biases. Showing these links or dependencies amongst biases is important to improve our understanding of the decision-making process. Moreover, recognizing these dependencies could help us better understand the causes and consequences of biases and ways of eliminating (or at least, decreasing) their adverse effects.

The purpose of this paper is two-fold.

The first purpose is to show that looking at biases jointly generates different insights than looking at them individually. We have chosen strategic change as the decision-making process to focus on. The biases involved are those that occur in information processing as organizations decide on whether to change. Through system dynamics modeling, we will show that looking at the change process by looking at the effects of multiple biases simultaneously generates a different insight into the consequences of change. Our aim is not, however, to show the totality of the links amongst all the biases. The literature and the number of biases are far too large for that. Our purpose is to demonstrate that it is important to take the interdependencies amongst biases into consideration.

The second purpose is to look at the phenomenon of commitment to strategy in more detail. As will be shown with the model, commitment to a given strategy has an important effect on the change behavior of organizations. Yet, in the literature, there is controversy on how commitment escalates. We will show that different opinions regarding commitment lead to quite different consequences. We will also look into the similarity between commitment to strategy and inertia concepts that come from different literature streams.

The paper is organized as follows. In section 2, we will focus on the importance of information for strategic change and the biases in information processing. It is in this section that we develop our proposition. In section 3, the model structure is explained. Section 4 is on model analysis. In section 5, we will look into the concept of commitment of strategy. Finally, section 6 we will present the limitations of the model and analysis and present the conclusions.

2. Importance of Information for Strategic Change and Biases in Information Processing

Information is one of the key components of strategic decision-making. Ungson et. al. (1981, p117) define information as "stimuli (or cues) capable of altering an individual's expectations and evaluation in problem solving and decision making". Organizations spend much time in gathering, storing, analyzing, and communicating information during their decision-making activities. Some researchers even argue that information gathering and processing are more crucial to the success of the firm than strategic decision making itself (Pfeffer and Salancik, 1978; Starbuck and Milliken, 1988).

Organizations need two types of information: environmental (external) information (to be able to detect trends and changes in their environment and make decisions) and internal information (to evaluate their performance). Organizations need relevant, timely, and accurate information about their environment. Successful organizations are those that can devise strategies and structures to fit the environmental conditions. Since organizations perceive their environment through environmental information, formulation of an appropriate strategy depends on identifying the relevant environmental factors that will help detect the important trends in the environment (Ungson et. al. 1981). Along with understanding their environment, organizations also need to assess their current performance. Internal

information is required for the latter. Information on the performance levels, resource availability etc. is very important for identifying how the organization is functioning given its current strategy and determining whether the organization is in alignment with its goals. The mixture of internal and external information would help the organization identify the gaps in performance/fit and possible adaptation(s) it has to make.

Even though information processing is very crucial to the survival of organizations and its importance is recognized, the process is not without problems. There are many factors that seem to render the identification of relevant information ineffective. First, there is an overwhelming number of potential information sources in the environment (Choudhury and Sampler, 1997) each including enormous amounts of information. Ideally, human beings should pay attention to cues proportional to the importance and utility of different cues (Sterman, 2000). However, decision-makers have limited scanning capacity and limited resources. The mismatch between the amount of available information and the limited information processing capabilities leads to unfavorable circumstances such as information overload and stress (figure 2, the factors leading to the use of biases and heuristics). To simplify the stressful situation faced and to reduce the mental effort required, decision-makers resort to biases and heuristics (in figure 2, solid line from the factors leading to the use of biases and heuristics to the use of biases and heuristics). As a result, they pay attention to information selectively. For instance, they choose to acquire and use information that confirms previously implemented policies (Staw and Ross, 1987; Kiesler and Sproull, 1982). Or they gather more of the same kind of information to increase confidence in their judgment (Hogarth and Makridakis, 1981) rather than collecting information to identify what is really happening in the environment. Such simplifying procedures (e.g., looking for confirming evidence or using simple mental maps) could, in the short run, take away the pressures caused by information overload, but they obstruct the identification of relevant information by restricting the focus of the organization and lead to biases.

The extant amount of literature on information processing biases focuses on the factors leading to the use of biases and heuristics and the consequences of individual biases. As such, the interactions between the biases and the interdependencies amongst them have not been looked at. We believe that the use of biases and heuristics further reinforce the factors leading to the use of these biases and heuristics (Figure 2, dashed line). This link does not mean that use of heuristics will affect all the factors identified in the box. We mean that the use of these biases can further increase the stressful situation and the subsequent mental effort required. And as a result, the use of the same or other heuristics and biases will be reinforced. Hence, we propose that the biases and heuristics literature should look at the occurrence of biases simultaneously rather than analyzing one bias in isolation from all the other ongoing biases.

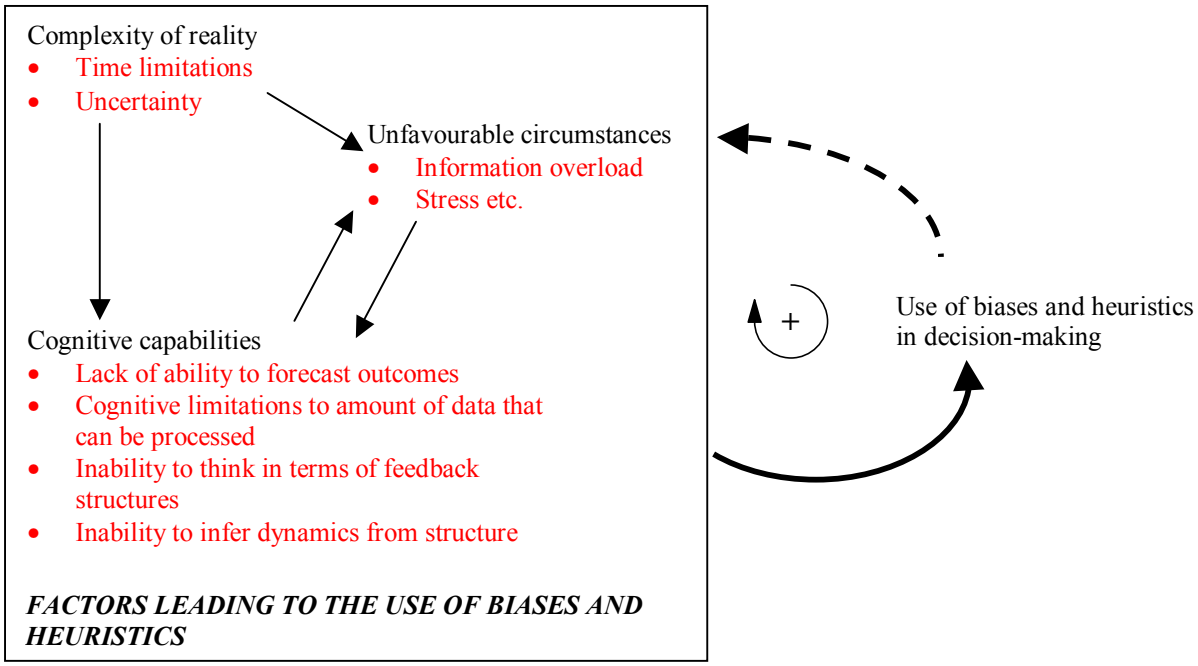

Figure 2: Positive feedback loop reinforcing the factors leading to the use of biases and heuristics

We, of course, need to show that such a proposition (i.e. looking at joint effects of biases) is indeed important. If we can demonstrate that isolated effects of two separate biases generate different results than the combined effect of these biases then we can say that our proposition is of importance. In a sense, we are testing our proposition by using a system dynamics model and showing that occurrence of one bias vs. multiple biases in information processing for a strategic change process leads to different outcomes for the organization. Hence, any analysis of strategic change that lacks the inclusion of the interdependencies amongst biases would generate different results than one where such mechanisms are considered. This would mean that if such interdependencies exist they should be taken into consideration.

In the following section, we will explain the structure of the model used for analysis.

3. Structure of the Model

In this paper, our concern is the joint effect of information processing biases on the decision of whether to go on with a strategy or change it. We will now look at the structure of the model and explain the change-generating mechanisms and the biases involved.

3.1 Base Model: Change-generating mechanisms

Organizations change their strategies if they feel pressure to change. The most important factor leading to the accumulation of this pressure is the performance problems the organization might be experiencing. The fit of the organization's strategy determines the performance of the organization[2]. A strategy is appropriate or fit when it is in alignment with

2 There are two dominant views on the determinants of organizational performance. The contingency theory emphasizes the importance of organization-environment fit as a determinant of performance, with the view that the appropriate organization form is contingent on the characteristics required by the environment (White and Hamermesh, 1981, Drazin and van de Ven, 1985). Thus, to be effective, the organization should achieve a fit

the competitive conditions the organization is embedded in. If a change takes place in the environment and this change would generate a misfit between the organization's strategic orientation and the competitive conditions, this would be a reason for strategic change (Tushman and Romanelli, 1985). As long as the strategic orientation of the organization fits the one required by the environment, the organization converges around its current strategic orientation. If for some reason (e.g. change in the environment) the strategic orientation turns out to be inappropriate then the pressure would start accumulating leading to the start of organizational change. Once the changes started are implemented, the misfit can be eliminated. This process that leads to the generation of strategic change is shown in figure 3.

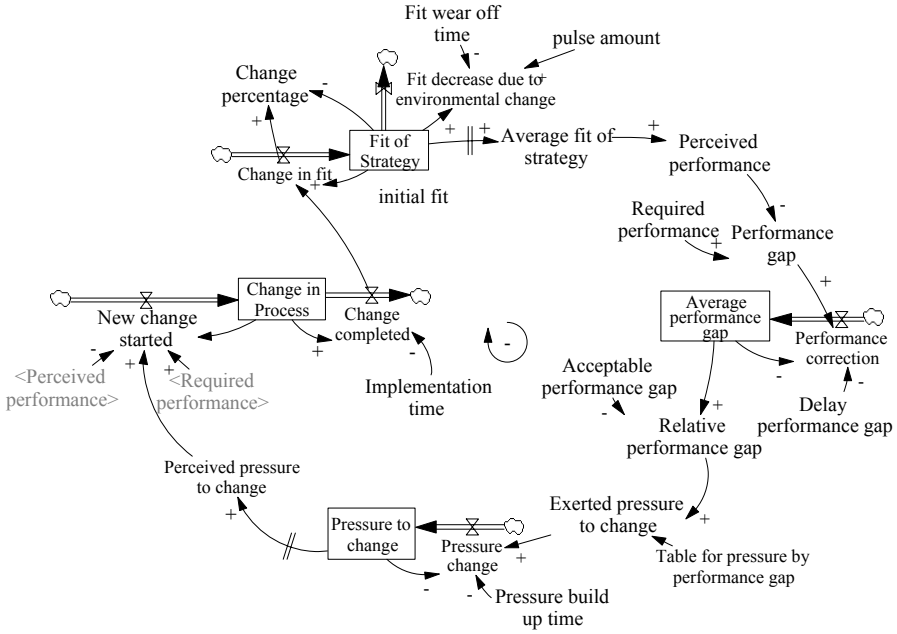

Figure 3: Change-generating loop

Fit of strategy – signifies the appropriateness, effectiveness, alignment or fit of an organization's strategy with respect to the external environment. This is a state variable, because it is the accumulation of the effects of past strategic changes and the changes in the environment. It ranges between 0 and 100. Zero means that the strategy of the organization is totally in misfit with its environment whereas 100 signifies perfect fit. Fit can change in two ways: change in strategy (implementation of the ongoing changes) and environmental change (e.g. a new law, a better technology, a new product). The fit of the strategy determines the performance. Hence, the performance gap actually refers to the amount of misfit of strategy. It is assumed that the organization strives for perfect performance (of 100).

Pressure to change – signifies the amount of pressure the organization experiences regarding whether to change or not. Pressure to change is a state variable since it signifies the cumulative pressure that builds up over time. The main source of pressure is the average performance gap (Tushman and Romanelli, 1985). As the average performance gap increases so does the pressure to change.

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between the environmental requirements and organizational strategy and structure. Congruency theory, on the other hand, stresses the importance of internal consistency between elements of structure (Child, 1972). How well the organization functions internally would affect how well it performs. In this paper, we have decided to limit ourselves to the contingency theory to keep the model simple. Hence, performance is determined by the fit of strategy.

Change in process – signifies the amount of ongoing changes in the organization. It is measured in terms of the amount of fit gap to be closed as a result of the on-going changes. Change in process increases as new changes are started due to the accumulated pressure to change and decreases as the changes are completed.

3.2 Biases and heuristics

We will now move our attention to the biases that are represented in this model. We do not claim to include all the biases into our model. The model should be seen as a first attempt in identifying the linkages between information processing biases. The totality of the relationships and loops that are in the model are shown in figure 4. For the full model specification is included in the appendix.

Below, we will look at external and internal information processing separately. However, we first need to explain the commitment to strategy concept since it has an effect on both the external and internal information processing.

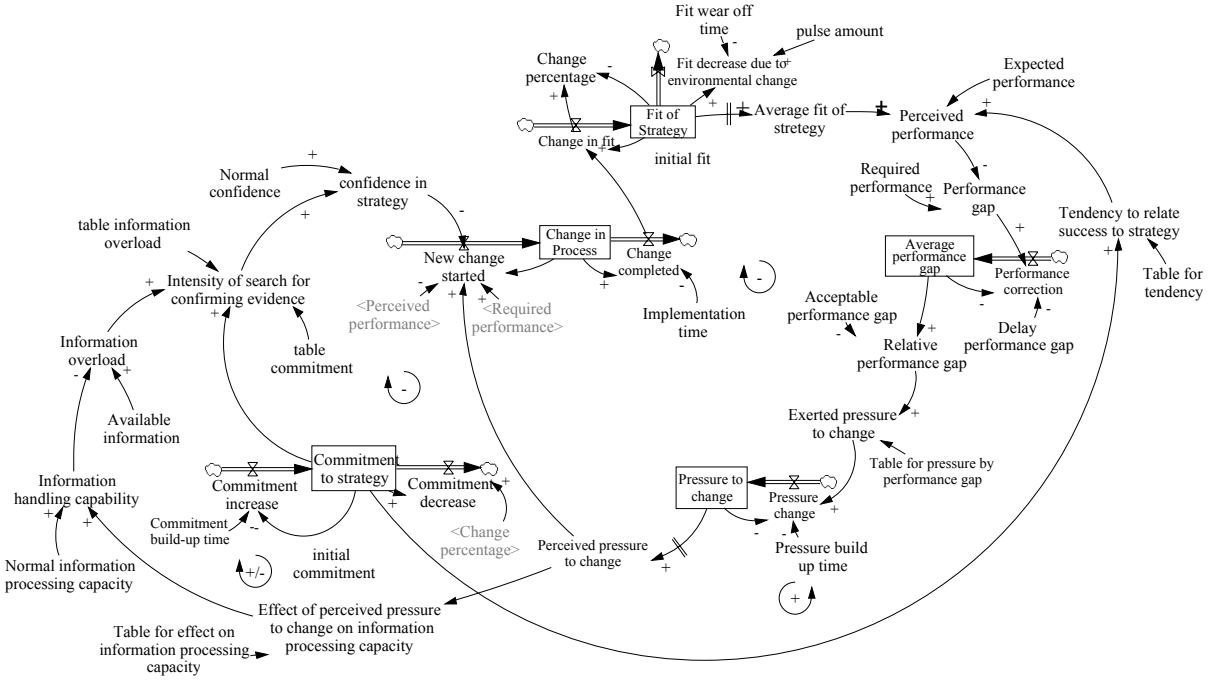

Figure 4: Biases in change process – The whole model

Commitment to strategy – signifies the extent of support for the current strategy. There are two main streams of literature that explain how commitment to a certain action increases. The trial and error learning literature assumes that behavior associated with success is repeated whereas behavior associated with failure is not (Lant and Mezias, 1992; Levitt and March 1988; Lant and Hurley, 1999). The escalation of commitment literature, on the other hand, states that even unsatisfactory performance leads to persistence and further commitment to a course of action[3] (e.g. Staw, 1981, Staw and Ross 1987). The latter literature stream states that decision makers want to justify their prior action by committing more resources as a means of showing that they were not mistaken by their initial decision. Moreover, people seem to be attached to sunk costs (money, time, and other resources) that have already been devoted to a (losing) course of action. Even though such persistence may be beneficial in

[3] Even though escalation of commitment literature primarily focuses on responses to negative feedback, Staw's (1976) original ideas predicted that escalation would occur both in positive and negative feedback situations.

stable environments, in the face of environmental change, it might prove to be harmful since it would disable the organization from changing.

In this paper, we represent this concept as commitment to strategy. Commitment is a stock variable since it builds up as a result of previous devotions of the decision-maker to the particular strategy. We assume that commitment increases continuously over time (with a time delay of approximately 1 year). This assumption reflects the idea that as the organization continues to use the same strategy, more time and resources are devoted to that strategy and hence, the commitment will increase. At the same time, commitment can decrease as well. Commitment of an organization is to a given strategy. When a withdrawal from a strategy takes place (i.e., if the strategy is changed partially or abandoned completely) then the commitment should decrease accordingly. Hence, in the model, commitment decreases proportional to the amount of changes made to the strategy[4]. If the changes made are large so will be the decrease in commitment.

It should be pointed out that we are taking the escalation of commitment literature (rather than the trial and error learning literature) as a basis for our commitment construct. Hence, possible effects of performance on escalation are not represented in the structure. Performance effects on (de-)escalation are a matter of debate in the commitment literature. We will come back to this issue later in section 5.

Commitment to strategy has effects on both external and internal information processing. We will first look at its influence on external processing and then, internal processing.

Biases in external information processing – Confirmation bias and (over)confidence – External information processing refers to the search for environmental information to determine whether the organizational strategy is fit to the environment. It has been shown previously that individuals and organizations look for confirming information. This is also known as the confirmation trap, "individuals tend to seek confirmatory information for what they think is true and neglect the search for disconfirmatory evidence" (Bazerman, 1998). What is important for our purpose, however, is *why* people search for confirming evidence. Caldwell and O'Reilly (1982) state "aside from justifying one's actions through continued resource allocation, trapped decision makers may also buttress their choices by actively seeking out supportive information to rationalize their position and by constructing arguments that justify their choice and undermine alternative approaches that might have been selected". Kiesler and Sproull (1982) state that organizations value their commitment to their policies and procedures more than data. They have shown that managers accept environmental information that confirms their beliefs to be diagnostic and they do not pay attention to disconfirming information: "Motivationally driven social cognition theories would suggest that even had the [disconfirming] information been available, executives would have either attacked its validity or ignored it because of their commitment to their own program" (p558). They, moreover, state that when managers have heavily invested in any situation, they are likely to discount information about the environmental changes detrimental to that situation. Hence, if decision-makers believe in a certain course of action then the information processing will be directed at the confirming evidence disregarding the disconfirming information (Staw and Ross 1987; Caldwell and O'Reilly 1982; Conlon and Parks, 1987).

Along with the effect of commitment, another information biasing takes place due to information overload, which is caused by the lack of balance between available information and information processing capacity (Hogarth and Makridakis, 1981; O'Reilly, 1980). This

[4] Amount of change in fit is compared to the existing fit. The ratio of the two gives a proxy of the extent of change that has been made to the strategy.

overload can be overwhelming, especially if the organization perceives itself to be under threat. Smart and Vertinsky (1977, see pages 640-641) have proposed that under stress, the cognitive abilities[5] and information processing abilities are reduced, leading to information overload which decreases the quality of information. The threat-rigidity theory (Staw et. al. 1981) also points to the linkages between threat/stress and information processing capabilities: "a threat may result in restriction of information processing, such as narrowing in the field of attention, a simplification in information codes, or a reduction in the number of channels used" (p502). When the threat is felt, the information search decreases due to the overloading of communication channels. Organizations rely upon prior expectations and hence, restrict their information processing to information that supports the chosen policy. The search results in information that is similar to that of the past (Starbuck et al., 1978).

In the model, both relationships are represented (see figure 5). Increase in commitment to strategy leads to an increase in intensity of search for confirming evidence. On the other hand, the threat the organization feels, as represented by the perceived pressure to change, leads to a reduction in the information processing capacity and hence, increase in information overload, which, in turn, constitutes the second factor increasing the intensity of search for confirming evidence. The more confirming evidence the organization has, the more confident it becomes with the chosen strategy (Einhorn and Hogarth, 1978; Hogarth and Makridakis, 1981; Schwenk, 1986). This confidence counters the perceived pressure to change. The more the confidence is the less likely will be change. These relationships add further feedback loops into the model.

The link between pressure to change and information processing capability (figure 5, the inner loop) is represented as a bell-shaped curve as the literature dictates (e.g. Staw et al., 1981). Being under high pressure, the organization would like to get out of the unfavorable situation as soon as possible. Hence, the vigilance in information search and processing would decrease, leading to an organization that has less processing capability both in terms of capacity and quality. On the other hand, when the pressure is very low, the organization does not feel the need to scan the environment and thus, has low processing capacity and quality. As a result, the capability is low at low values of perceived pressure and it increases as the pressure increases. But if pressure rises above a certain level then the capability starts to decrease. Hence, a bell-shaped curve. It would be possible and desirable to separate these positive and negative relationships between these two variables into two causal pathways. For instance, it could be that when pressure increases the stress increases leading to lower capability and when pressure increases the need for new information increases leading to higher capability. However, since the literature is silent regarding these paths, we have decided to use the bell-shaped curve that is used in the literature.

[5] Cognitive abilities are "the abilities of the decision unit to interpret information, generate options creatively, calculate and make choices between alternative courses of action" (Smart and Vertinsky, 1977).

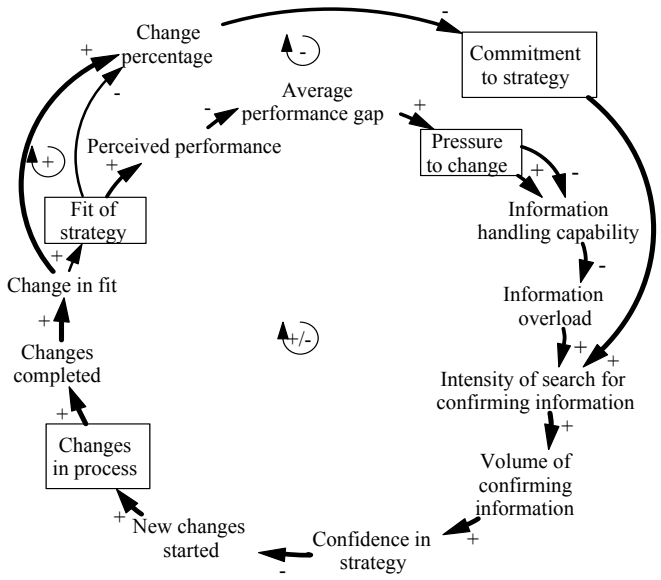

Figure 5: Effects of commitment and information overload on confirmation bias and confidence

Bias in internal information processing – Tendency to relate success to strategy – As commitment affects the external information processing; it also affects the internal information processing. Internal information processing refers to the information collection that leads to the perceived success of the strategy used. As external information, internal information can be biased too. If decision-makers are committed to their strategy then they will believe that the strategy is successful. As Schwenk (1984) states, "Decision-makers who believe that the company's current strategy is successful may ignore information suggesting gaps between performance and expectations".

In the model, this tendency, named as the tendency to relate success to strategy, is determined by the commitment to the strategy (figure 6). Higher commitment leads to a stronger tendency to show that the strategy is performing well. Consequently, the perceived performance is biased towards the expected performance.

We need to stress that perceived performance signifies two effects. In system dynamics, we use perceptions to refer to time delays in collecting and processing information. Decision-makers cannot know the instantaneous performance; hence, the smoothing of information is incorporated into the perceived performance. However, the time delays are not the only factors playing a role in determining the perceptions. Bias is also part of the equation. If the decision maker is biased, for instance, in her information processing, so will be the perceived performance. This bias is incorporated by the tendency variable, which determines the relative weights the decision maker gives to the expected performance and the real performance measure (which is the average fit of strategy). Hence, the perceived performance is a weighted average of the expected performance and the average fit where the tendency is the weight given to the expected performance (see equation 1). As a result, the more biased the decision-maker is, the less will be weight for the real performance and the performance will be perceived to be higher than it actually is[6].

Perceived performance = Average fit of strategy *(1-Tendency) + Expected performance * Tendency

Equation 1: The perceived performance

[6] Of course, if the real performance is already high (close to the expected performance level), the bias will not be as recognizable.

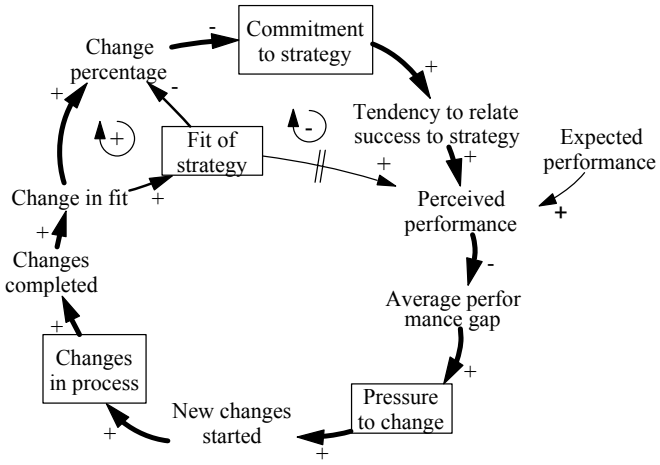

Figure 6: Tendency to relate success to strategy

Having explained the model structure, we will now move on to model analysis.

4. Model Behavior/Analysis

As reactive theories of change, such as the punctuated equilibrium model (Tushman and Romanelli, 1985) dictate, we will look at organizations' change behavior in reaction to an environmental change. We will show that looking at the effects of single versus multiple biases in strategic change will make a difference for the outcomes of change processes. We will consider two different environmental change patterns (Brown and Eisenhardt, 1997):

Environment 1: One time (punctuated) change in the environment such as the sudden emergence of a breakthrough technology. This is created with a pulse function in the *fit decrease due to environmental change*. In the graphs, this type of change is referred to as *pulse*.

Environment 2: Continuous, incremental changes in the environment such as constantly shifting market opportunities. This is created by defining a fit decay function in the *fit decrease due to environmental change*. The fit decays over time with an average lifetime of 200 months. In the graphs, this type of change is referred to as *decay*.

4.1 Base run

The base model represents the mechanism that will lead to the start of change in the face of environmental change (change-generating mechanisms explained in section 3.1). In this structure, it is assumed that no biases interfere with the decision of change. The model is reactive in the sense that given a change in the environment, the organization would start changing to restore the fit of its strategy. If we assume that there are no biases interfering with the decision process, what would be the change behavior of the organization? The theories predict that once the organization realizes the lower performance, it will start changing. In figure 7 and 8, the behavior patterns under the two environmental conditions are presented. As expected, in an environment with one radical change (Pulse base change), the organization starts changing after a while and the change goes on till perfect fit is restored (after which the change comes to a halt) (figures 7 and 8). Change does not start immediately after an environmental change since it takes a while for the pressure to build up. In decay base change, an organization in a continuously changing environment is simulated. Theories

of organizational change are not specific about the reaction of organizations in such environments. Yet, Brown and Eisenhardt (1997) state that the incremental changes in the environment render the discontinuous reactions from organizations ineffective and organizations should learn to change continuously to be able to survive. This is what we see in decay base change. The organization starts changing to counteract the on-going environmental change and keeps on changing continuously (and incrementally) (figure 8) and eventually balances its fit (figure 7). At equilibrium, the amount of change started is at the magnitude of the fit erosion due to the environmental change. Hence, the resulting equilibrium fit level is dependent on the speed of environmental change. The slower the environment changes, the lower will be the gap between the equilibrium fit and the perfect fit. Other than the speed of environmental change, the implementation time influence this gap as well. If the change were implemented faster then the resulting fit would be higher.

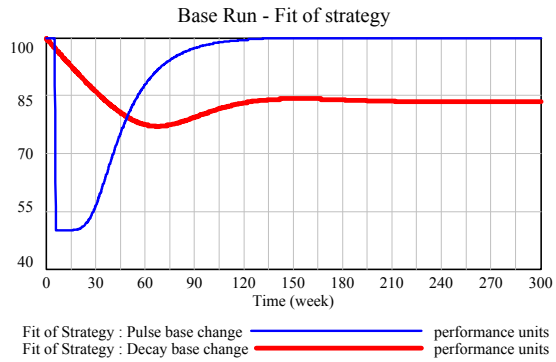

Figure 7: Base run –Fit of strategy

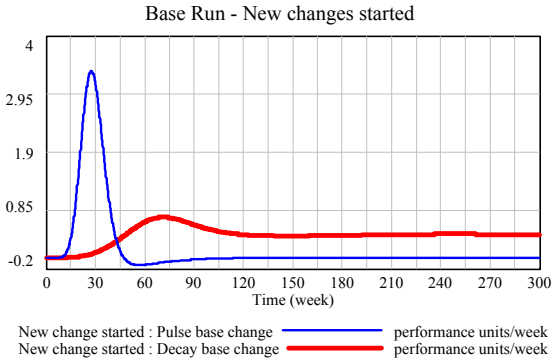

Figure 8: Base run- change in fit

Under the assumption that there are no biases interfering with the decision-making process, the organization restores its strategic fit. However, as the extant literature shows, biases and heuristics do play a role in strategy making. Hence, we should consider their effects.

4.2 Effects of external information processing biases: Confirmation bias and confidence

We will first look at the effect of the confirmation bias and resulting (over)confidence. The confirmation bias takes place when the organization collects confirming evidence due to commitment to its strategy or as a reductionist technique to cope with the information overload. The more confirming evidence an organization collects, the more confident it becomes in its strategy and hence, opposes the change. The interplay between the confidence and the pressure to change determines the amount of new changes started.

In Figure 10, the results for pulse and decay environments are given (compared to the base runs presented in section 4.1, the simulation period is extended to see the overall behavior patterns better). In the pulse case, we see that the organization does not change at all. The reason is that the commitment to the strategy leads to the search for confirming information that subsequently leads to confidence. The confidence withholds the organization from changing (since only when the felt pressure is higher than confidence, change starts[7]). Since every period with no change leads to higher commitment and higher resulting confidence, the organization does not withdraw from its current strategy. The simulation results show that the organization can go on with a low-fit strategy. However, we should also

[7] The strength of confidence or rather, the strength of the effects of commitment and information overload on confidence is very important here. If these relationships would be less strong then the confidence will be lower constituting a lower threshold to change.

consider that in real life, this might not be possible. An organization that does not fit its environment is bound to lose business and be defeated by its competitors. Hence, it is possible that if the organization does not change, its fit decays further over time and the organization eventually dies.

The model has been tested with different levels of initial commitment and amounts of pulse. The initial commitment level does not have an effect on the results. A higher amount of pulse, for instance a loss of 70% of the fit, does lead to a change reaction restoring the fit back to its maximum level. This means that it takes a large amount of fit gap to generate enough pressure to overcome the confidence the organization has to its strategy.

In the decay environment, on the other hand, we see that the organization goes through periods of change rather than changing continuously. Before starting a change, the organization waits till its fit is quite low rather than changing as the environment changes. This is due to the high confidence caused by high commitment to strategy and low information processing capabilities. In the face of no change, the commitment to strategy keeps on building up and leads to the reinforcement of the confirmation bias and confidence. The pressure, on the other hand, keeps on increasing in the face of decreasing fit and leads to decrease in information processing capability, further information overload, and hence, confirmation bias and confidence.

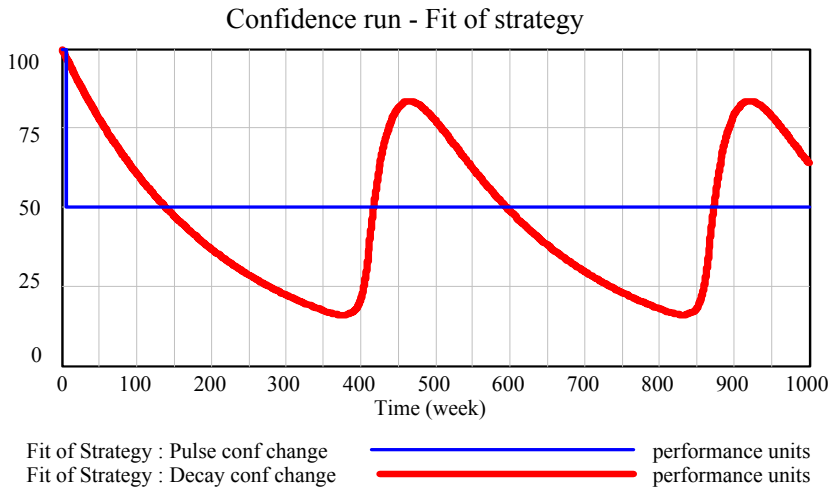

Figure 10: Fit of strategy for an organization that is under the influence of confirmation bias. Two environmental conditions are considered: one-time change environment (pulse conf change) and incremental change environment (decay conf change).

4.3 Effects of internal information processing bias: Tendency to relate success to change

We will now look at the effect of internal information processing bias on the organizational change process. As explained before, being committed to a strategy, the organization might not perceive the performance indicators accurately and perceive the performance to be higher than it actually is. The base run is a special case where the tendency is assumed to be 0, meaning that the perception is not biased at all. In Figure 9, the behavior in pulse and decay environments is given.

As can be seen, the tendency to relate success to strategy affects the change process. In both cases, the tendency to relate success to the strategy leads to a delay in the start of the change as well as a sub-optimal strategy once the change ends. The tendency makes the organization perceive its performance better than it actually is. Pressure does not accumulate fast enough and therefore, the change is started later in time. Even when the change process

begins, the organization initiates fewer changes than required due to low pressure. Fewer changes mean longer duration before the fit can be restored and during this period, commitment keeps on building, further reinforcing the tendency to perceive the strategy successful. As a result, under both circumstances, the organization has low performance for a long period of time and ends up with a low equilibrium fit[8]. This is especially problematic for an organization in the decay situation where the organization is much too late in counterbalancing the on-going decay in fit. (Note: In the model, the expected performance that is used for the tendency is assumed to be the perfect performance of 100. Obviously, if the expected performance were lower, the effect of tendency would be decreased.)

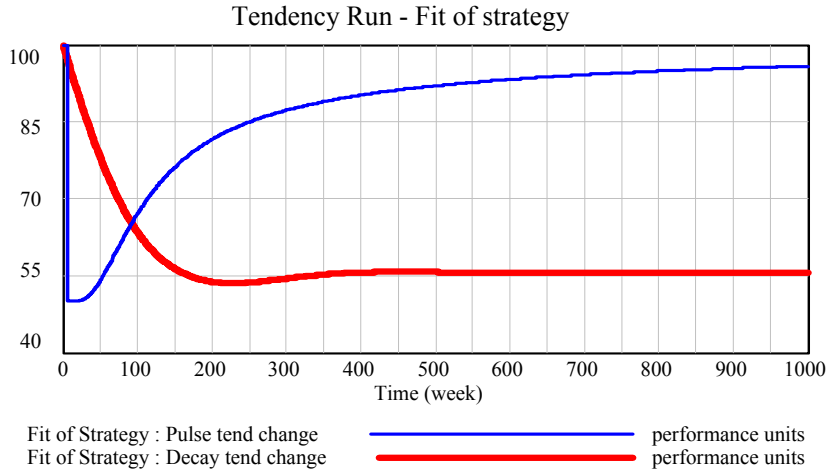

Figure 9: Fit of strategy when the organization has a tendency to see its performance better than it actually is. Two environmental conditions are considered: one-time change environment and incremental change environment.

4.4 Combined effects of internal and external information processing biases

So far, we have looked at the biases occurring in only internal processing or only external processing. However, in an organization, these two processes take place simultaneously. Hence, so do the biases. In figures 11 a and b, the behavior patterns corresponding to the 4 different runs (no bias, only internal information processing biases, only external information processing biases, external and internal information processing biases together) are compared. Figures 11 a and b correspond to pulse and decay environments, respectively. We see that under both circumstances, the joint effect of the internal and external processing biases leads to the demise of the organization. In the pulse case, the organization does not change at all and keeps on having a low-fit strategy. In the decay case, on the other hand, the organization continuously loses fit and eventually dies.

The tendency bias generates a delay in the building up of the pressure. The confirmation bias and confidence on the other hand generate a high barrier to the start of a change process. During this combined delay, the commitment keeps on building further reinforcing both the internal and external processing biases. The ever-increasing pressure, on the other hand, causes information overload leading to further confirmation bias and confidence. The result is an organization that cannot generate a change process. The combined effect of the biases generates a worse situation than were we not to look at the biases or look at them in isolation from one another.

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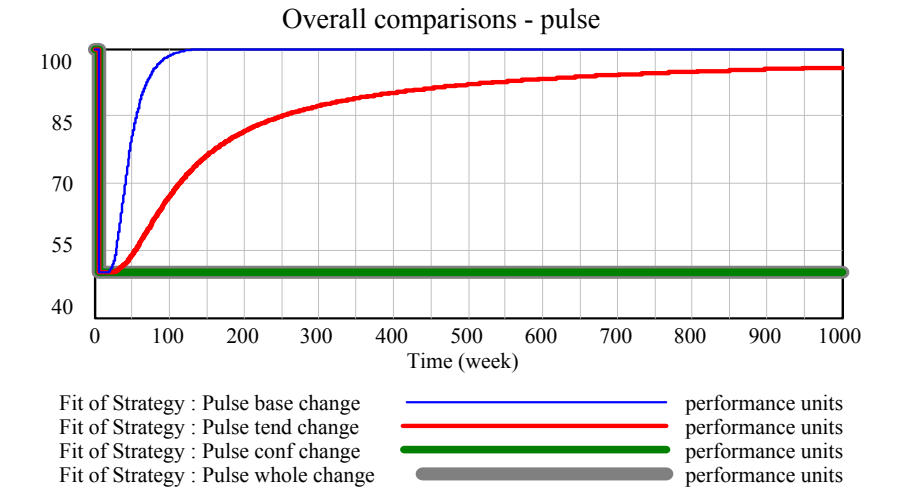
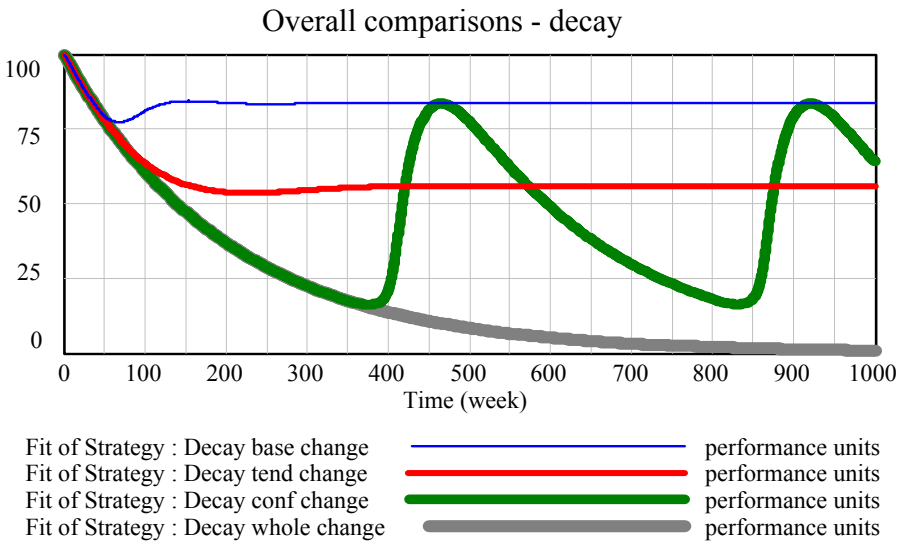
[8] Once again, the implementation time has an effect on both of these measures. Lower implementation time would mean faster recovery of the fit. Yet, with respect to the comparison of the behavior of base vs. tendency cases, the value of the constant does not make a difference.



(a)



(b)

Figure 11: Fit of strategy compared in four different runs: no biases are assumed to occur (base run), only internal information processing biases are considered (tend), only external information processing biases are considered (conf), internal and external information processing biases are considered (whole). Two environmental conditions are considered: **(a)** one-time change environment (pulse) and **(b)** incremental change environment (decay).

5. Further Look into Commitment

In the previous section, we showed that looking at biases simultaneously rather than in isolation and basing analysis on feedback loops generates interesting insights. Such an analysis shows us the effects of the interactions of the biases.

When only external or only internal information processing biases are considered, the organizational change process leads to lock-in to sub-optimal strategy in a one-time change environment and to an ineffective manner of coping with environmental change in a continuously changing environment. When all the biases are taken together, the organization cannot recover to its full strength and in certain circumstances, it dies. These results would suggest that since all organizations suffer from biases, there would be no organization to

perform at its full strength. This could indeed be true since the successful organizations are those that outperform their competitors. A most successful company in a given environment does not necessarily perform at its best but it does perform better than others in the same environment. Hence, the fittest organizations survive. Looking at the results involving the decay environment, we can further speculate that all the organizations in a continuously changing environment would die. This, of course, is not necessarily true although as the population ecology literature would advocate, it is possible that organizations die and new ones replace them. Yet, there are organizations that survive in continuously changing environments. There can be two reasons to why we cannot replicate this case. First of all, it might be that such organizations have different change generating mechanisms than the reactive one we have assumed in our model. The other reason could be the way such organizations handle commitment to strategy controlling its adverse effects in difficult times. The latter factor is an interesting one to look into since by managing their commitment, organizations can cope with biases. In this way, they can also generate new change mechanisms.

Analysis of section 4 demonstrates the importance of commitment to strategy in determining the course of a change process. Commitment and its effect on the other biases can explain why change attempts take too long to start (and why organizations do not change and die), why organizations get locked into low performing strategies, and why change efforts do not accumulate to bring an organization to a full-fit strategy.

In the organizational change literature, organizational inertia is given as the main cause behind these behavioral outcomes. Inertia is seen as the resistance of an organization to change (Hannan and Freeman, 1984). Yet, inertia is a concept that has not been analyzed in detail. The causes of inertia and the policies organizations can use to decrease their inertia (when in trouble) are not very clear. There are interesting similarities between the concept of inertia and commitment to strategy. It could be that the causes leading to commitment to strategy are similar or the same as the causes leading to the accumulation of inertia. Hence, links between the inertia literature and the escalation of commitment literature might prove to be fruitful.

Different organizational theorists have different opinions of inertia. Some suggest that inertia is resistance to all kinds of change and hence, organizations cannot change (e.g., Hannan and Freeman, 1984). If the environment were to change, organizations with high inertia would die. Others suggest that inertia is resistance to all other than radical change (e.g., Tushman and Romanelli, 1985), hence, organizations can change radically if faced with high performance gaps. The same dichotomy seems to exist in the commitment literature. Some suggest that commitment to a course of action will disable the organization from changing (e.g., various works of Staw and his colleagues). Others suggest that in the face of performance pressures, the organization will withdraw from the current action and adopt another (e.g., Northcraft and Wolf, 1984 and Lant and Hurley, 1999).

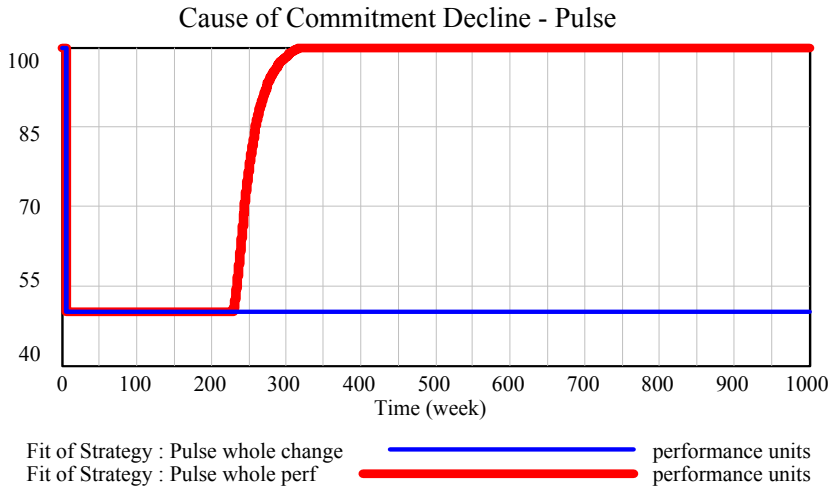
In our analysis, we have assumed that performance pressures do not affect the commitment to strategy (following the line of reasoning by Staw et al.) or rather, we can say that even in the face of low performance, the commitment keeps on building up. It is only when the strategy changes that commitment declines. This approach to commitment leads to the death of the organization. Such behavior patterns are supported by case studies of Staw and his colleagues, where organizations committed to a course of action kept on supporting it, even though the organization had very low performance results. These effects are rather similar to

those suggested by the organizational researchers advocating the detrimental effects of inertia.

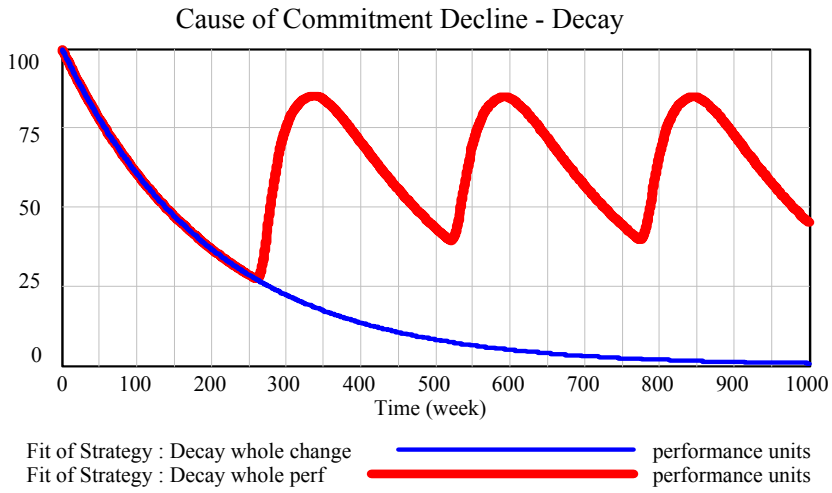
Although supported in the literature, failure due to commitment and inertia is not the only behavior pattern possible. Some organizations do change successfully. Whereas the inertia literature is silent regarding how inertia can decline to allow change, there is information regarding how commitment might be declining in some organizations. There is a point of view regarding how performance affects commitment. Some researchers support the idea that in the face of negative performance feedback, commitment de-escalates and organizations withdraw from action. Once again, these researchers have presented real cases where such withdrawal took place.

We have incorporated this factor into our model to see the dynamic consequences of different forms of commitment determinants. We have assumed that the fraction of decline in commitment is dependent on the perceived pressure to change. Hence, when the organization is under high pressure (meaning that the organization perceives a large performance gap) the commitment decline is also high. Figure 12 represents the behavior of an organization in which performance feedback affects the commitment to strategy is compared to one in which performance pressures are of no effect. Figures 12 a and b refer to the pulse and decay environment, respectively. As the literature suggests, the use of performance feedback to update commitment to strategy enables change. When the commitment is decreased the organization becomes less biased both in internal and external information processing tasks. As a result, the organization gets a more "correct" perception of its environment and performance. Thus, the change starts.

Yet, we should realize that the late reaction to changes in the environment still presents itself as a problem. Moreover, in the continuously changing environment, due to this delay in reacting to change, the organization cannot achieve continuous change.



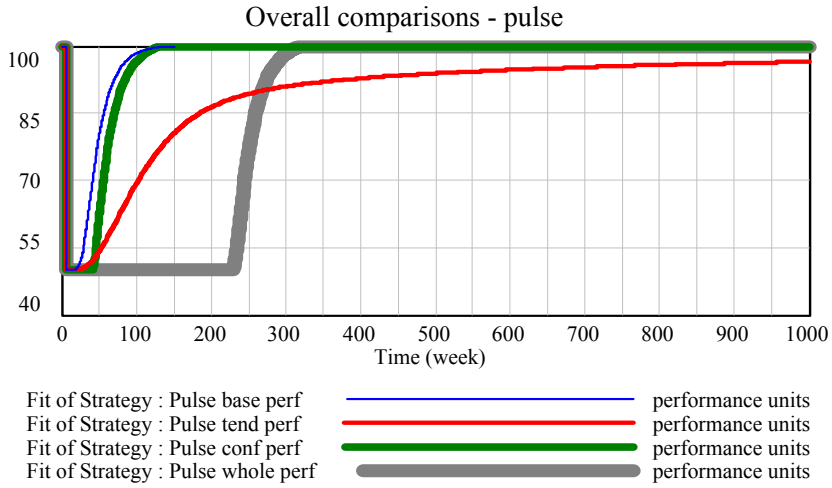
(a)



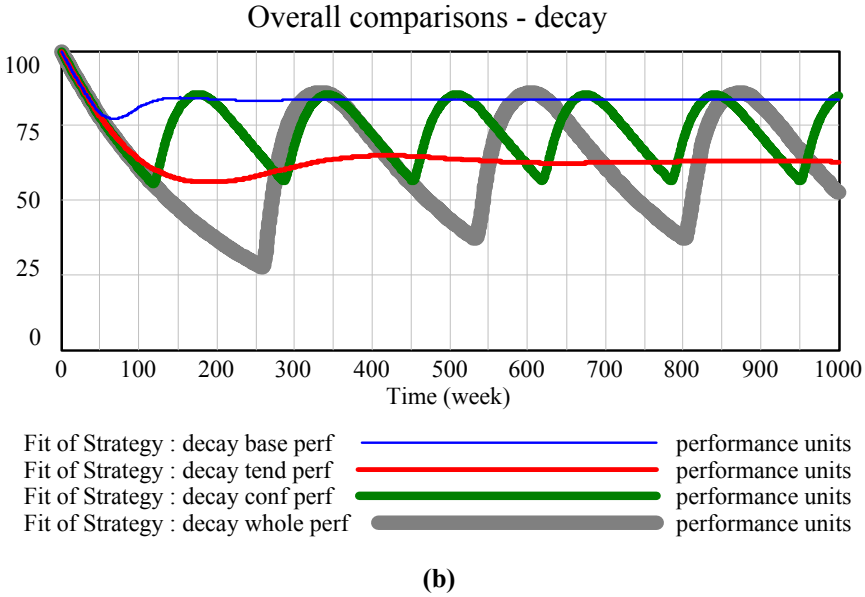
(b)

Figure 12: Consequences of different determinants of commitment. Two environmental conditions are considered: **(a)** one-time change environment (pulse) and **(b)** incremental change environment (decay).

At this point, the reader might be interested in knowing what this second formulation means for our results of section 4. The comparison for different sub-models is represented in figure 13. As can be seen, considering the effects of individual vs. multiple biases does still affect the consequences experienced by the organization. In both environments, there is a considerable long delay before the change starts (hence, the organization has performance problems for a long period, not a desirable situation for any organization) and in the continuously changing environment, the organization is not able to generate effective changes that will bring it in phase with the environment.



(a)



(b)

Figure 13: Fit of strategy compared in four different runs when the commitment is affected by the performance pressures: no biases are assumed to occur (base run), only internal information processing biases are considered (tend), only external information processing biases are considered (conf), internal and external information processing biases are considered (whole). Two environmental conditions are considered: **(a)** one-time change environment (pulse) and **(b)** incremental change environment (decay).

6. Discussions and Conclusions

The analysis of the joint effects of multiple biases is missing in the literature. There is a strong need for such a perspective since only by looking at the whole picture, further insights can be gained as to how biases affect the organizational outcomes. In this paper, we have looked into the joint effects of information processing biases on the strategic change process. We have shown that looking at isolated effects of individual biases generates different behavioral outcomes than looking at the simultaneous effects of multiple biases. From a system dynamics perspective, it might be obvious that the behavior patterns change when new feedback loops are added. Yet, showing the differences generated in behavior patterns is very valuable for setting research goals for behavioral decision-making and organizational change literature streams. As such, we are able to show that the analysis and research focus in these areas should be shifted towards understanding the joint effects of biases and how to overcome one bias in the presence of others.

We have also seen that as we added more biases into our analysis, the results got progressively worse. For instance, the reaction time to start changing increased and organizations got locked into low performing strategies. This raises the question of what would happen if we were to extend this model to include other biases we did not look at so far. Would the results get worse and worse? Even though we cannot answer this question without doing the modeling, the analysis of section 5 could generate some insights. Comparing the results where only the tendency to relate success to strategy bias (called tendency bias from now on) was active to the results where all the biases were active, we can spot two counter-intuitive results. First of all, under the influence of all the biases, the organization is able to attain a higher fit than under the influence of only the tendency bias. This might mean that the confirmation bias and the resulting confidence in strategy actually

take away some of the negative effects of the tendency bias. The fact that the organization waits a while before reacting leads to high pressure, which generates the necessary amount of change to reach a full-fit strategy in the pulse case. In the decay case, on the other hand, the organization does achieve higher fit levels. Yet, these are temporary and the organization has periods with lower-fit strategy as well. It would be interesting to investigate which of the two situations is more beneficial to the organization. Is it better to have a continuous moderate fit or to have periods of high fit alternated with periods of low fit?

We can also extend this discussion to include the possible effects of factors that are not included in the model. In the situation where only the tendency bias is considered, the organization keeps on changing continuously to counter-balance the environmental change. In the situation where all the biases are active, the organization has periods of change and periods of stability. Literature on success of change would support the idea that most change processes end up being unsuccessful because the changes cannot be effectively implemented due to the resistance of the employees (Nadler 1981). One of the causes of this resistance is prolonged periods of instability: "Individuals in organizations can only stand so much uncertainty and turbulence". The overload of duration and amount of change going on may create dysfunctional effects such as extreme defensive behavior and resistance to any proposed change (Nadler 1981, Bennebroek Gravenhorst et. al. 1999). Hence, if we were to include the effects of resistance to change and implementation success we could see that the case with all the biases involved results in better performance than the case with only the tendency bias.

Following this discussion, we can be in a position to propose that when more and more biases are involved in a decision-making activity some of the adverse effects might cancel each other out, leaving the organization better off.

Another insight we can generate from this modeling work is the similarity between the concepts of commitment to strategy and inertia. It is possible that organizational inertia can be explained in terms of commitment. How inertia accumulates and de-accumulates are not well established in the literature whereas its effect on the change process is very fundamental. The link between these two literature streams might generate improvements for the understanding of the inertia concept.

There is a controversy in the commitment to strategy literature regarding the effects of negative performance feedback on commitment. In order to investigate the behavioral consequences of the two viewpoints, we have incorporated both into the model and compared the results. If the commitment declines with negative performance feedback then the organization can change whereas ignoring negative performance feedback causes the organization to get locked into a low-fit strategy and even die. Given the drastic difference in the organizational outcomes, it is desirable to focus further research efforts on identifying how commitment really declines and why certain organizations choose one de-escalation strategy over the other. Understanding these causes would generate a basis for identifying the leverage points for effective and timely de-escalation of commitment. Since commitment is beneficial in certain circumstances (such as stable or very volatile environments), it should also be researched *when* commitment should de-escalate. Thus, we would propose that the literature should focus its attention on how to manage commitment rather than generating more and more cases in showing that commitment exists. Understanding how commitment can be handled effectively could lead to major understanding of how change processes can be carried out more effectively.

There are several limitations to the model and the analysis. As explained before, the aim of this study was not to show how all the biases are related to each other but to show that inclusion of the interaction of biases into the analysis does lead to different insights. Yet, a further, more detailed modeling would enhance our understanding of the effects of biases in decision-making. In this respect, our effort should be seen as a starting point.

We believe that we have shown some important information processing biases. However, the model should be expanded and improved to validate the results of our analysis. For instance, we have not included the processes that cause the accumulation of commitment. Literature streams such as escalation of commitment give a more detailed account of the factors that affect the commitment to a strategy. Including these causes explicitly would increase the validity of the model and could generate further insights.

The drifting goals structure could also be an interesting extension. Erosions in required performance (and even expected performance) would lead to further delays in change processes, and possibly, to further deterioration of the resulting strategic fit.

From an organizational change point of view, factors affecting the success of change processes, such as implementation success and the appropriateness of the newly chosen strategy are very important. Such success factors could also be affected by the biases that are included in this model. For instance, the appropriateness of strategy depends on the information processing capabilities of the organization. A decline in the quality of information processing could lead to the implementation of inappropriate strategies that could further deteriorate the fit of the organization. Extending the bias with such factors and their relations to the biases would be desirable.

We have assumed that the tendency to relate success to strategy causes the perception of performance to be higher than the actual when commitment is high. It is also possible that under low commitment, the organization perceives its performance to be lower than the actual. As Schwenk (1984) points out: " Those who believe it [company's current strategy] is failing may overweight information on gaps between performance and expectation". Such a bias could have both positive and negative effects. It could, under environmental change conditions, decrease the delay in reaction. It could, on the other hand, also lead to unnecessary change when the organization is actually performing well.

Even though the model has the above-explained limitations, we believe that given the interesting results it shows, this is a promising area of research that should be pursued in the future.

References

Bazerman, M. H. 1998. *Judgment in Managerial Decision Making*, John Wiley & Sons, Inc.

Bennebroek Gravenhorst, K. M., R. A. Werkman, and J. J. Boonstra. 1999. The Change Capacity of Organizations: General Assessment and Exploring Nine Configurations. *9th European Congress on Work and Organizational Psychology: 29-54.*

Brown S. L. and K. M. Eisenhardt. 1997. The Art of Continuous Change: Linking Complexity Theory and Time-paced Evolution in Relentlessly Shifting Organizations. *Administrative Science Quarterly* 42: 1-34.

Caldwell, D. F. and C. A. O'Reilly. 1982. Responses to Failure: The Effects of Choice and Responsibility on Impression Management. *Academy of Management Journal* 25(1): 121-136.

Child, J. 1972. Organizational Structure, Environment, and Performance: The role of strategic choice. *Sociology* 6: 2-22.

Choudhury, V and J. L. Sampler. 1997. Information Specificity and Environmental Scanning: An Economic Perspective. *Management Information Systems Quarterly*. 21 (1): 25-54 .

Conlon, E.J. and J.M. Parks. 1987. Information Requests in the Context of Escalation. *Journal of Applied Psychology* 72: 344-350.

Drazin, R. and A. H. van de Ven. 1985. Alternative Forms of Fit in Contingency Theory. *Administrative Science Quarterly* 30: 514-539.

Einhorn, H.J. and R.M. Hogarth. 1978. Confidence in Judgment: Of the Illusion of Validity. *Psychological Review* 85: 395-416.

Hambrick, D. C. 1982. Environmental Scanning and Organizational Strategy. *Strategic Management Journal* 3: 159-174.

Hannan, M. and J. Freeman. 1984. Structural Inertia and Organizational Change. *American Sociological Review 82: 929-964.*

Hogart, R. M. 1987. *Judgment and Choice: The Psychology of Decision*. Wiley.

Hogarth, R. M. and S. Makridakis. 1981. Forecasting and Planning: An Evaluation. *Management Science* 27(2): 115-138.

Kiesler, S. and L. Sproull. 1982. Managerial Response to Changing Environments: Perspectives on Problem Sensing from Social Cognition. *Administrative Science Quarterly* 27: 548-570.

Lant, T. K. and A. E. Hurley. 1999. A Contingency Model of Response to Performance Feedback. *Group and Organization Management* 24(4): 421-437.

Lant, T. K. and S. J. Mezias. 1992. An Organizational Learning Model of convergence and reorientation. *Organization Science* 3: 47-71.

Levitt, B. and J. G. March. 1988. Organizational Learning. *Annual Review of Sociology* 14: 319-340.

Nadler, D. 1981. Managing Organizational Change: An Integrative Perspective. *The Journal of Applied Behavioral Sciences* 17(2): 191-211.

Northcraft, G.B. and G. Wolf. 1984. Dollars, Sense, and Sunk Costs: A Life Cycle Model of Resource Allocation Decisions. *Academy of Management Review* 9(2): 225-234.

Pfeffer, J. and G. R. Salancik. 1978. *The External Control of Organizations: A Resource Dependence Perspective*. New York: Harper & Row.

O'Reilly III, C. A. 1980. Individuals and Information Overload in Organizations: Is More Necessarily Better? *Academy of Management Journal* 23(4): 684-696.

Schwenk, C. R. 1984. Cognitive Simplification Processes in Strategic Decision-making. *Strategic Management Journal* 5: 111-128.

Schwenk, C. R. 1986. Information, Cognitive Biases, and Commitment to a Course of Action. *Academy of Management Review* 11(2): 298-310.

Smart, C. and I. Vertinsky. 1977. Designs for Crisis Decision Units. *Administrative Science Quarterly* 22: 640-657.

Starbuck, W. H., A. Greeve, and B.L.T. Hedberg. 1978. Responses to Crises. *Journal of Business Administration* 9: 111-137.

Starbuck, W. H. and F. J. Milliken. 1988. Executives Perceptual Filters: What They Notice and How They Make Sense. In D. Hambrick (Ed.). *The Executive Effect: Concept and Methods For Studying Top Managers*: 35-66. Greenwich, CT: JAI Press.

Staw, B. M. 1976. Knee-deep in the big muddy: A study of escalating commitment to a chosen course of action. *Organizational Behavior and Human Performance* 16: 27-44.

Staw, B. M. 1981. The Escalation of Commitment to a Course of Action. *Academy of Management Review* 6(4): 577-587.

Staw, B. M. and J. Ross. 1987. Behavior in Escalation Situations: Antecedents, Prototypes, and Solutions. *Research in Organizational Behavior* 9: 36-78.

Staw, B. M., L. E. Sandelands, and J. E. Dutton. 1981. Threat-Rigidity Effects in Organizational Behavior: A Multilevel Analysis. *Administrative Science Quarterly* 26: 501-524.

Sterman, J.D. 2000. *Business Dynamics: Systems Thinking and Modeling for a Complex World*. Irwin McGraw-Hill, Boston.

Sutchliffe, K. M. Organizational Environments and Organizational Information Processing. In: (Eds. Jablin, F. and L. Putnam) *Handbook of Organizational Communications*.

Tushman, M. and E. Romanelli. 1985. Organizational Evolution: A Metamorphosis Model of Convergence and Reorientation. In L. L. Cummings and B. M. Staw (Eds.). *Research in Organizational Behavior* 7: 171-222. Greenwich, CT: JAI Press.

Ungson, G. R., D. N. Braunstein, et al. 1981. Managerial Information Processing: A Research Review. *Administrative Science Quarterly* 26: 116-134.

White, R. E. and R. G. Hamermesh. 1981. Toward a Model of Business Unit Performance: An Integrative Approach. *Academy of Management Review* 6(2): 213-223.

Appendix: Equation Listing

Perceived performance = Average fit of strategy * (1-Tendency to relate success to strategy) + Expected performance * Tendency to relate success to strategy

~ performance units

~ Perceived performance is the performance as the organization feels it. It has two aspects. It depends on the average fit of the strategy. On the other hand, the performance is biased towards expected performance depending on how committed the organization is to its current strategy.

Average fit of strategy = SMOOTH(Fit of Strategy,4)

~ performance units

Commitment decrease = 0 * Commitment to strategy * Commitment decrease fraction + MIN(Commitment to strategy, Commitment to strategy * Change percentage)

~ commitment units/week

~ The amount of decrease in commitment per week. The formulation " MIN(Commitment to strategy,Commitment to strategy * Change percentage)" is used to simulate the situation where commitment decreases only as a result of change in strategy. This formulation is used for the analysis of section 4. The second formulation, "Commitment to strategy*Commitment decrease fraction" is used to simulate the situation where commitment decreases as a result of performance pressures. This formulation is used for the analysis of section 5.

Change in fit = Change completed

~ performance units/week

~ This is the amount of change in fit as a result of implemented changes.

Tendency to relate success to strategy = Table for tendency(Commitment to strategy)

~ Dmnl

~ Signifies the bias in performance measure. It is equivalent to the weight given to the expected performance. 1-tendency is the weight given to the objective performance measure of fit.

Pulse amount = 50

~ performance units/week

Fit decrease due to environmental change = 0*Fit of Strategy/Fit wear off time + pulse amount* PULSE(5 ,1)

~ performance units/week

~ The formulation “Fit of Strategy/Fit wear off time” is used to simulate the decay environment and the formulation “pulse amount* PULSE(5 ,1)” is used to simulate the pulse environment

New change started = (Required performance - Perceived performance-Change in Process) * IF Then Else ((Perceived pressure to change -confidence in strategy)>0, Perceived pressure to change-confidence in strategy, 0)

~ performance units/week

~ Amount of new changes started per week.

Effect of perceived pressure to change on information processing capacity = Table for effect on information processing capacity (Perceived pressure to change)

~ Dmnl

Commitment decrease fraction = Table for commitment decrease fraction(Perceived pressure to change)
~ 1/week

Perceived pressure to change = SMOOTH(Pressure to change, 26)
~ pressure units

Performance correction = (Performance gap-Average performance gap)/Delay performance gap
~ performance units/week

Exerted pressure to change = Table for pressure by performance gap(Relative performance gap)
~ pressure units

Change completed = Change in Process/Implementation time
~ performance units/week
~ Amount of change that is completed (implemented) per week.

Commitment increase = (1-Commitment to strategy)/"Commitment build-up time"
~ commitment units/week
~ The increase in commitment per week. Commitment increases continuously.

Confidence in strategy = Normal confidence * Intensity of search for confirming evidence
~ pressure units
~ The total amount of confidence in strategy. It can be seen as the pressure to not change since it works as a threshold against change.

Table for commitment decrease fraction([(0,0)-(1,1)],(0,0),(0.155294,0.0284698),(0.254118,0.0782918),(0.369412,0.209964),(0.451765,0.359431),(0.5,0.5),(0.550588,0.679715),(0.614118,0.822064),(0.672941,0.903915),(0.748235,0.950178),(0.804706,0.97153),(0.856471,0.985765),(0.910588,0.989324),(1,1))

Normal confidence = 0.5
~ pressure units
~ Normal amount of confidence an org feels towards its strategy.

Table information overload([(0,0)-(2,1)],(0,0),(0.225882,0.0284698),(0.348235,0.0676157),(0.494118,0.117438),(0.64,0.181495),(0.771765,0.24911),(0.884706,0.359431),(1,0.5),(1.11529,0.615658),(1.20941,0.701068),(1.44471,0.850534),(1.56235,0.914591),(1.71765,0.975089),(1.83059,0.992883),(2,1))

Initial fit = 100
~ performance units

Initial commitment = 0.5
~ commitment units

Commitment to strategy = INTEG (Commitment increase-Commitment decrease,initial commitment)
~ commitment units
~ Signifies the total amount of commitment the organization has to its strategy. Commitment ranges from 0 to 1. Commitment of 1 means that the organization is totally supporting its current strategy.

Fit of Strategy = INTEG (Change in fit-Fit decrease due to environmental change, initial fit)
~ performance units

~ Signifies the fit of organization's strategy to the strategy demanded by the environment. Fit of strategy is a sign of organization's performance.

Acceptable performance gap = 0
~ performance units

Relative performance gap = (Average performance gap-Acceptable performance gap)/100
~ performance units
~ Signifies the difference of the existing performance gap from the acceptable performance gap. The difference is divided by 100 for scaling purposes.

Table for tendency(
[(0,0)-(1,1)],(0,0),(0.141176,0.024911),(0.24,0.103203),(0.341176,0.217082),(0.416471,0.352313),(0.5,0.5),(0.618824,0.626335),(0.724706,0.697509),(0.863529,0.736655),(1,0.75))

Expected performance = 100
~ performance units
~ The total expexted performance of the strategy. The expected performance is assumed to be equal to the maximum fit a strategy can have.

Intensity of search for confirming evidence = table commitment(Commitment to strategy)+table information overload(Information overload)
~ Dmnl

Table commitment(
[(0,0)-(1,1)],(0,0),(0.117647,0.0177936),(0.197647,0.0462633),(0.275294,0.088968),(0.331765,0.163701),(0.390588,0.263345),(0.432941,0.348754),(0.5,0.5),(0.534118,0.622776),(0.571765,0.72242),(0.621176,0.80427),(0.694118,0.875445),(0.748235,0.914591),(0.804706,0.953737),(0.870588,0.985765),(1,1))

Available information = 2
~
~ Amount of available information

Normal information processing capacity = 0.5
~
~ Amount of information that can be handled under normal pressure.

Information handling capability = Normal information processing capacity * Effect of perceived pressure to change on information processing capacity
~
~ Amount of information that can be handled

Table for effect on information processing capacity(
[(0,0)-(1,2)],(0,0.04),(0.0447059,1.08185),(0.0611765,1.40214),(0.1,1.75),(0.145882,1.90036),(0.2,2),(0.3,2),(0.4,1.94306),(0.447059,1.91459),(0.5,1.83),(0.6,1.57),(0.661176,1.37367),(0.7,1.18),(0.727059,0.982206),(0.757647,0.782918),(0.778824,0.697509),(0.8,0.58363),(0.851765,0.391459),(0.894118,0.263345),(0.931765,0.170819),(1,0.12))

Pressure change = (Exerted pressure to change - Pressure to change)/Pressure build up time
~ pressure units/week

Performance gap = Required performance-Perceived performance

~ performance units

Information overload = Available information-Information handling capability

Average performance gap = INTEG (Performance correction, 1e-006)
~ performance units

Change in Process = INTEG (New change started-Change completed, 0)
~ performance units
~ Change in Process signifies the amount of ongoing changes in the organization. It is measured in terms of the amount of fit gap to be closed as a result of the on-going changes.

Change percentage = ABS(ZIDZ(Change in fit, Fit of Strategy))
~ 1/week

Delay performance gap = 4
~ week

Fit wear off time = 200
~ week

"Commitment build-up time" = 60
~ week

Implementation time = 26
~ week

Pressure build up time = 8
~ week

Pressure to change = INTEG (Pressure change, 0)
~ pressure units
~ Amount of pressure the organization feels given the performance gap. This pressure dictates the percentage of the gap that should be closed in the fit of the strategy.

Required performance = 100
~ performance units

Table for pressure by performance gap(
[(0,0)-(1,1)],(0,0),(0.1247,0.04626),(0.2282,0.1139),(0.3176,0.2598),(0.3929,0.4235)
,(0.4471,0.5979),(0.52,0.79),(0.5906,0.9324),(0.7,1),(0.8,1),(0.9,1),(1,1))

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