

READY, AIM, BACKFIRE! ACTION ERRORS AND ORGANIZATIONAL IATROGENESIS

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ABSTRACT

Type I or “Alpha” errors arise when we reject a true hypothesis and Type II or “Beta” errors arise when we “fail to reject” a false hypothesis. Mitroff, in the 1970s introduced Type III or “Errors of the third kind” typified when managers solve the “wrong” problem. Type I, II and III errors are well documented. This paper adds fundamental action errors as type IV and type V errors and adds the compound error of the 6th kind as a dangerous source of organizational iatrogenesis. Iatrogenesis refers to inadvertent adverse effects, sometimes worse than the initial problem, resulting from treatment or advice. Those who fail to act when action should have been taken commit a type IV error. Those who decide to act, when they should have withheld or been patient have committed a type V error. Errors of the 6th kind are combinations of the other types of error that lead to organizational iatrogenesis.

INTRODUCTION

Making decisions about what actions might be taken and whether or not to act at all is a fundamental to managing. When subordinates ask: “what are we going to do, boss?” a manager is supposed to have a cogent response. This begs the question: should action be taken or should action not be taken? When managers, intent on solving problems focus upon event attributes and event structures related to a problem, they have to consider three levels of analysis. First they have to be sure they are working on the right problem. Secondly they have to figure out how the forces involved in the problem interact with each other and how they interact with the problem. Third, they have to decide to act or to not act. At each of these three decision levels, there may be decision error. This error compounds as sub-levels of the decision interact with each other, implying a three dimensional decision-making matrix full of error-laden paths.

Some of these decision error paths are worse than others. That is, not all wrong decisions are equal. The big hairy decision errors are those with iatrogenic outcomes. Iatrogenesis is associated positively intentioned actions that do more harm than good, often generating new areas of risk/harm that did not previously exist. Risk management dictates that the fallout of decision errors be minimized. Improvement will come from wisdom in examining each level and avoiding those paths that tend to be most associated with severe iatrogenesis. We suggest that attention is often paid to analysis of problems and the related variables, with a presupposed or tacit action decision. To the extent that this is the case it is problematic. Managers might wisely remain aware of Hippocrates’ statement “*primum non nocere*” (first, do no harm). Statistics also indicate that performance improvement interventions quite regularly lead to *decreased* organizational performance [1]. This paper makes the case avoiding serious iatrogenesis means increasing our attention on the decision of whether to act or to withhold from acting.

Business administration classes spend much time training managers for examining relationships between the forces of a problem, and offering viable solutions. Those classes utilizing the case study method further train managers to question what is the problem and are we examining the right problem? [2] and the subsequent literature provide sound reference around the issue of solving the wrong problems. Mitroff and the subsequent literature provide sound reference around the question of solving the wrong

problems. However, vastly under-represented in management training and research literature is consideration of the final decision: should we act? Here, we ask: when is it appropriate to act, and when is it appropriate *not* to act, even in the presence of a feasible and empirically tested strategy for action?

Iatrogenesis is inadvertent impacts or outcomes brought forth by a treatment or supposed cure, and is commonly used to describe adverse affects and effects. Ivan Illich [3] describes clinical, social and cultural iatrogenesis. Clinical iatrogenesis is damage caused by toxic, unsafe or ineffective treatments. Social iatrogenesis occurs when medical solutions are depended upon and expected for more and more ills. Cultural iatrogenesis is a sense-making transformation of life's critical events into medical events, to be dealt with using medical treatments and medical science as a source of meaning. Technological iatrogenesis has more recently added to the discussion and Palmieri & Peterson [4] provide an excellent review of that literature. In contemporary life, the term 'iatrogenesis' is most typically used in healthcare management and the medical sciences to describe negative consequences of actions taken by physicians, the notion of iatrogenesis may be more broadly applied. Illich [3] started a conversation about (physician and health care institutional) cures that have consequences worse than or at least as bad as the initial problem. This paper applies the general concept of iatrogenesis to explain a class of management action decisions that backfire. Our general thesis is that without careful consideration of the action error described below, decision makers blind themselves to the risk of iatrogenic solutions that create more problems than they solve.

VISIONING ERROR, CORRELATION ERROR AND ACTION ERROR

Clawson [5] describes "the leadership point of view:" seeing what needs to be done; understanding the underlying relationships and forces at play, and having the courage to initiate action." Following this framework, decision errors may be separated into three distinct kinds: "visioning errors," "correlation errors" and "action errors." Firstly, visioning errors may be made when deciding what the main problem is that needs to be fixed. Such meta-level errors are those described by Mitroff and Betz [2] as errors of the third kind. Secondly, correlation errors may be made when interpreting empirical evidence while figuring out causes of problems, and relationships between the various forces at play. These errors are the classic Type I (α) and Type II (β) errors described by Neyman and Pearson [6,7]. Thirdly, action errors may occur when deciding whether or not, and when to act. These action errors are herein proposed as errors of the fourth and fifth kind. Finally, a dangerous compound error of the sixth kind may occur when particular combinations of other kinds of error introduce new forces that have unforeseen interactions and impact outside of the field of attention.

Visioning errors happen when managers are deciding what the problems or issues are that need to be addressed. When managers do not notice, fail to consider a live hypothesis [8] or fail to pay attention to main issues and levers, and instead focus attention and effort on sub-ordinate or inconsequential issues, then they have made *visioning errors*. Seeing what needs to be done means discerning which problems are tightly linked to the prioritized outcomes they hope to bring about. When management focuses upon corollary problems that only indirectly impact desired outcomes, or when attention is limited to effects of root problems rather than the root problems themselves, then management is committing errors of vision. Mitroff and Betz [2] labeled the mistake of working on the wrong problem or issue an "error of the third kind."

Correlation errors occur when pondering, testing and deciding about relationships between variables such as existing forces, possible actions and potential outcomes related to a problem. Type I (or α) errors occur when the null hypothesis is mistakenly rejected -- we mistakenly reject that there is no relationship between the variables. In other words, there is not in fact sufficient evidence to support the hypothesis,

but we mistakenly decide that the evidence does support the hypothesis. It is not unusual to find managers believing they have evidence that “A” is the cause of “Problem B,” when there is in fact actually not sufficient evidence of a relationship.

Action errors occur when deciding whether to act on a proposed solution. Managers, after deciding what needs to be done, face a decision of whether or not to take action. There are two kinds of action errors, actions that you should have taken and action that you should not have taken.. Action error *does not* occur in cases 1a) when action is taken when action is truly needed, and 1b) when action is not taken when it is not appropriate. Action error *does* occur 2a) when action is taken, when it should not be taken, and 2b) when action is not taken when it should be taken.

Certainly there are multiple possible causes for a manager, having already decided what might be done *about* a problem, to then either act or not act. Sometimes a manager acts on a correct decision about what needs to be done, and the problem gets solved. When managers fail to act, often this is in the belief that systems and procedures are already in place to solve the problem at hand. Sometimes managers decide not to act because they believe that the problem will simply go away, or at least fade into inconsequence, if they exercise patience and wait it out. In either case, the decision to act or to forebear may be the correct decision. We call these action errors ‘Type IV’ errors and ‘Type V’ errors. Type IV errors and Type V errors deserve special attention because they are the only kinds of error that can lead to iatrogenesis on their own.

Concatenation of Visioning Error, Evidence Error and Action Error

There is certainly no guarantee that only one kind error is committed per problem. After all, there are three possible genres of error, and it is possible for management to make all three kinds of error, none of the errors, or any combination. Poor decision makers (or those with bad luck) might find themselves all too often working on the wrong problem, accepting unfounded cause and effect relationships, and then acting when they shouldn’t. There are $2 \times 3 \times 4 = 24$ (twenty-four) possible combinations to examine. The two (2) covers the bimodal situation of “vision error” and “no vision error.” The three (3) counts “no correlation error,” “Alpha error,” and “Beta error.” The four (4) covers the action possibilities: no non-action error, no action error, action error, and “non-action error.”

We utilized a decision tree to diagram the paths and interactions of this three part decision making process. We use standard binomial notation of “0” for an error and “1” for a correct decision at each of the three levels through the decision tree. The labels “Right, 1” or “Wrong, 0” on the first decision stand for the correct decision to work on the *right problem* and the incorrect decision to work on the *wrong problem*. The next level of labels covers possibilities when analyzing evidence, testing for correlations and possible cause effect relationships. “No Error, 1” “Wrong (α) 0,” and “Wrong (β) 0” are the labels for the three possible decisions about correlation among the data: a right decision about what the evidence/data shows; a Type I error of believing in a correlation that does not exist; or a Type II error of not believing in a correlation that does exist. The third level of labels stand for the possible action errors. An “a” stands for acting, and a “w” stands for waiting. A “1” means that it was the correct action decision, and a “0” indicates an incorrect action decision. Thus a path of ‘1, 1, 1a’ stands for: right problem, causes understood, takes action that is needed. A path of ‘1, 1, 0a’ indicates ‘right problem, causes understood, unnecessary action taken.’

Using this decision tree allows for probabilities to be calculated using the binomial distribution. The odds of each decision path are simply dependent upon the probability that each kind of error is made at each step. For example, perhaps a manager quite good at recognizing and prioritizing problems is right

80% of the time. Further assume that this manager is a stickler for an audit trial, making sure that all the reasonably available evidence is gathered, correctly measured and tested, so we assign a 0.9 probability that no correlation error will be made when analyzing the evidence, with a 0.05 chance of type I error and 0.05 chance of type II error. Finally, assume that this manager is good at knowing when to act, when to withhold action, and has the courage to act when it is indicated. If we then assign a 0.95 probability this good decision maker does not make a Type IV error or a Type V action error then *there is only a 68.4 percent chance ($0.8 \times 0.9 \times 0.95$) that a very good decision maker like the one we have assumed will make no errors.* One would expect that a more average decision-maker would have a lower probability of making the right decision. Nutt [9] reports that half of the decisions made in organizations fail, and we do not find this claim surprising.

No Error

The ideal situation is when no decision errors are made. There are only two paths in the decision tree like this, noted by a 1, 1, 1 score. The first describes the leader making no errors. In this cell, the decision may be assumed to be sufficiently solved with no enduring problems connected to the solution. Leadership has done at least three things correctly. Firstly, management is working on the right problem. They have had clear enough macro-vision to see what needs to be done and not get distracted into working on subordinate, associated or inconsequential problems. Secondly, management has gathered enough of the proper evidence/information to discern fact from belief, desire and fiction, and to uncover true correlations among the forces involved from apparent but non-existent correlations, and to locate true causes from among the many effects and correlates. Thirdly, management has acted upon this evidence because there is not another effective curative process already underway.

The second 1, 1, 1 path is similar to the first in all respects except that management has the good judgment to refrain from taking action, even though the causes of the problem are now understood: This might be described as the “Good decision, no action, problem solved” path. Refraining from action may be the proper decision for a variety of reasons. Firstly, the problem may be the type that just goes away if one waits it out. Dealing with the common cold and or an employee’s occasional bad mood seems to fall into this category of problem. Burgelman and Grove [10] describe how various instances of dissonance require no action, (unless it is “strategic dissonance”). Leaders, they say, should know their organizations well enough to discern between ordinary dissonance that is best ignored and will go away, and strategic dissonance that requires action. Boal and Hooijberg [11] suggest that discernment of this type lies at the heart of managerial wisdom. The real question is whether or not the manager can yield to the logic of this path given the "bias for action" that many managers have. Given a problem, managers may need to defend their reputation as a take charge decision maker, and thus act when they would be better off not acting. Some wisdom on the part of the decision maker is called for if they are to be able to discern between 1_A and 0_A. If they cannot, they may create problems of the third kind or iatrogenic solutions.

The iatrogenic decision maker: Error of the 4th Kind (Type IV)

Acting to solve a problem, be it the right problem or the wrong problem, can create other difficulties. Sometimes solutions are “iatrogenic,” meaning that they create more, or bigger problems than they solve. Faced with such a possibility the decision maker should thoroughly examine all the potential system effects, and perhaps refrain from action. In the case that the decision was an attempted solution to the right initial problem, and the problem variables were well understood, one important problem is now replaced by another, perhaps worse problem.

Here the decision maker takes charge, makes a decision based beliefs supported by correlation errors, resolving the existing problem yet creating more and greater problems to be solved. This often occurs when the manager did not anticipate interactions between endogenous variables and exogenous forces, especially non-linear interactions. This may occur because the manager compartmentalizes the decision not foreseeing how the effects may set up other, more difficult problems, or because the manager's time frame is too limited. We might call one who takes this path "the narrow scope iatrogenic decision maker." A classic example is Three Mile Island (Osborn and Jackson, 1988). There was a leak in the coolant system and the valve froze up. They decided to fix the problem by draining the coolant, and this lead to the disaster in which the plant went south in a major meltdown. Sometimes, because decision makers do not anticipate the futurity of their decisions, focusing, on too short a time period, problems that could reasonably be anticipated are ignored. Sometimes, the decision maker might realize his solution will cause other problems, but because he thinks the immediate problem is more important, or he believes the anticipated problem is a bridge to be crossed when it happens, or the stakeholder group is too weak to worry about, s/he will go ahead and make a decision that they know will create more and greater problems for the organization. But, that will be someone else's' headache.

Error of the 5th kind (Type V)

Deciding to take no action, when no action is called for, is the correct solution. However, falsely believing that the problem will either solve itself or simply go away is an error of the 5th kind. Such errors allow the situation to linger, at best, or to fester and worsen requiring greater resources to solve. The decision maker on path 1, 1, 0w might be described as "the wishful non-action taker." This person mistakenly thinks that if they do nothing the problem will either go away or resolve itself through existing processes and network externalities. What they don't realize is that the problem either will not go away or that the original problem will metastasize and require greater resources to solve the longer organization waits. This may occur for a number of reasons. Fox-Wolfgramm, Boal, and Hunt [12] discuss how an organization's identity can lead to resistance to change. Boal [13] notes that the rules and routines that make up an organization's transactive memory inhibit search, and lead to a misdiagnosis of the problem or non-action. Finally, Wetzel and Johnson [14] discuss how organizational failure and decline is often preceded by a denial of reality leading to non-action. While not taking action may be the correct decision, in many managers' eyes a worse outcome is a reputation of lack of courage or initiative to take action. For the manager decision-maker, there exists a risk management dilemma: which is worse, making an action decision that turns out bad or not making a non-action decision that allows a problem to evolve into a disaster. In organizational cultures with a bias for action, we would likely find more errors of the 4th kind than errors of the 5th kind. In organizational cultures or structures with a bias for inaction, we would likely find more errors of the 5th kind than errors of the 4th kind.

Errors of the 6th kind

Errors of the 6th kind are compound errors that may occur in three circumstances. Two of them are indicated when an error of the 3rd kind has already been made, and then an action error is made. For example, there is the '0, 1, 0' situation, in which Type III error has already been made, then the initial problem is still outside of the attention, and so possible negative interactions with it may not have been considered when a manager acts. Not only does the real problem lay untreated and festering, but mistaken action on the wrong problem may introduce new correlates that may create forces that did not previously exist. This compound decision error situation is a type VI Error ("error of the 6th kind"). In this case action creates more problems than it solves and allows other problems to combine in new ways and morph into a qualitatively different problem. The other type VI error circumstance takes the 1, 0, 0 form. For example '1, 0a, 0a,' notes a decision path of working on the right problem, seeing a cause that does not exist, and then acting when one shouldn't. By introducing new forces into a group of

previously uncorrelated forces, new correlations and unexpected outcomes occur. In cases when one of the two action errors (non-action, when action should have been taken, or action when action should not have been taken) are made on the “wrong” problem, the true problem will likely morph into something unrecognizable in terms of the original problem. Unlike errors of the 4th kind which cause escalation of the problem, or errors of the 5th kind which give problems time to fester, these ‘error of the 6th kind’ paths allow problems to grow qualitatively as well. Errors of the 6th kind often result in situations where the problem resolution does not just require more resources, but entirely different resources altogether.

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