
Thinking About Second & Third Order Effects: A Sample (And Simple) Methodology

By Michael G. Miller

Editorial Abstract: Mr. Miller explores the classical problems of cause and effect, and offers a systematic way to address complex contingency options. He advocates changing existing methodologies to support contemporary operational planning.

Introduction

One often hears discussions in national security circles about the need to identify and understand the implications of potential primary, secondary and even tertiary effects of our actions. Gaining an understanding of these effects is fundamental to our ability to craft a branch—an option that allows us to cope with changes in the operational environment. Joint Publication 1-02, the *Department of Defense Dictionary of Military and Associated Terms*, describes the term branch as:

“The contingency options built into the basic plan. A branch is used for changing the mission, orientation, or direction of movement of a force to aid success of the operation based on anticipated events, opportunities or disruptions caused by enemy actions or reactions.”

Stated another way, a branch is a preplanned option that allows us to respond to expected changes in the operating environment. But how do these changes come about? Some changes will be induced by our initial set of actions; other changes may arise because our initial set of actions creates effects that, in turn, become the cause of other effects. Enemy actions might induce still more changes. To address these changes and create the branches to our basic plan, we must examine potential consequences or effects of our actions, as well as those resulting from enemy actions and reactions. However, this is not a simple examination; sometimes we do not or cannot accurately predict effects stemming from our actions. Without these accurate predictions, it becomes more difficult to build proper branches into the basic plan. But the military need is clear: the imperative to prevail in crises and conflicts dictates a concerted attempt to understand what 2nd and 3rd order effects may stem from our own first-order effect. While we may not be able to predict the cause-effect behavior of inter-related complex systems with precise certainty, we can try to understand the nature of the elements that will interact. In this way, we gain at least some sense of the range of potential

consequences, enabling us to craft the branches of our plan as completely as possible.

The purpose of this article is to offer an admittedly simple, but certainly systematic way of thinking about 2nd and 3rd order effects. If applied, it should help those planners responsible for crafting branches—contingency options—to apply a repeatable methodology to “get a handle” (to the degree possible) on “what might happen.” In this way, planners are able to build into their plans a set of reasonably comprehensive, yet still manageable, contingency options.

The Problem

WARNING!

It is dangerous to fly two aircraft in close proximity because of the magnitude of inter-related aerodynamic effects.

This quote from an older B-52 Flight Manual is intended to warn pilots about the dangers inherent in conducting aerial refueling, but it also serves to highlight the problems we face



*B-52 Stratofortress refuels over Afghanistan
(Air Force Link)*

in thinking about and understanding potential 2nd and 3rd order effects. The elements of the problem can be summarized this way:

- Effects have causes
- Effects can, and usually do, become causes of another effect(s)
 - There can be a large number of cause-effect “chains” created based on a single causal event
 - Effects that were intentionally caused to produce a specific outcome can spawn an effect that was unintended and/or unpredicted
 - These unintended or unpredicted effects spawned from the original cause can be unwelcome if these are counter to the objectives

It is certainly beyond the scope of this article to explore the subject of causality theory. Let us simply say causality theory and analysis can be extremely complex. While mathematical models can help solve problems of causality, applying these models to operational planning—especially during crisis action planning—can be problematic. It takes time to establish the proper modeling conditions, define the variables, and run the models. Often there just isn’t sufficient time to take advantage of available modeling resources. Thus, operational planners who are “on the hook” to develop branches must have a way to think through the potential ramifications of a causal event, to identify potential positive and negative outcomes with respect to the objectives. Planners must have some way to bound, scope, or otherwise limit the examination of cause-effect chains to those most important.

A Sample Methodology

Before presenting this methodology, one other complicating factor—of particular significance to the information operations (IO) planner—should be introduced. This is the notion that effects can become causes that spawn more effects, and these manifest themselves in three different areas:

- The Time Area (seconds, minutes, hours, days, weeks)
- The Space Area (local, regional, international, terrestrial and outer)
- The Domain Area (cognitive, electronic, human and physical)

With this in mind, let’s lay out the methodology using this template, to help with the explanation and later example:

Cause¹ yields Effect¹

Effect¹ becomes Cause² yields Effect²

Effect² becomes Cause³ yields Effect³

Step One: After the initial Cause¹ - Effect¹ pairing is determined, decide what one additional effect—we’ll label it as Effect²—will be spawned from the first effect caused. For

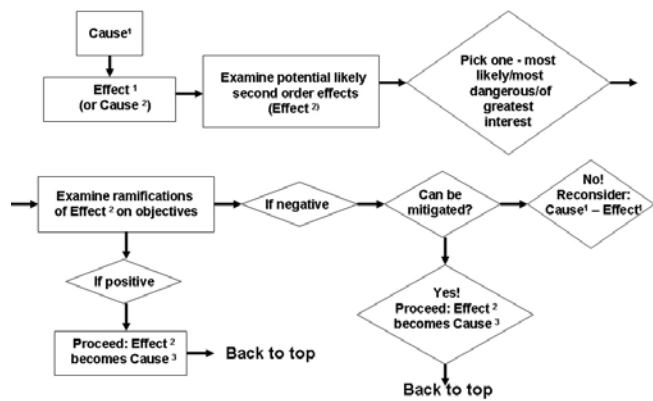


Figure 1. Process Diagram

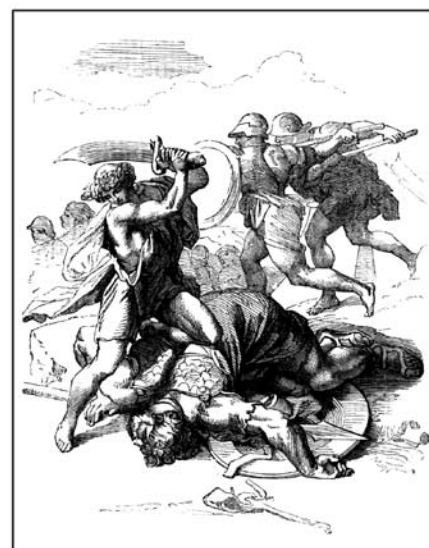
simplicity’s sake, we are going to identify one additional effect at a time, although theoretically many additional effects can be spawned by the first effect that was (don’t worry, there will be an example later to make things more clear).

Step Two: Decide what the ramifications of Effect² will be on your objectives. If the ramifications are negative, then...

Step Three: Decide if you can mitigate the negative ramifications Effect² has on your objectives. If so, then Effect² is viewed as Cause³ and we run the three step process again, resulting in Effect³. If the negative ramifications of Effect² on the objectives cannot be mitigated, we must reconsider whether to conduct the Cause¹ action that yielded Effect¹. Figure 1 shows the process.

An Example

The best way to illustrate the concept of 2nd and 3rd order effects is by example; the one we will use is the Biblical example of David and Goliath. The following story is taken



David and Goliath

David versus Goliath (1875 Children’s Bible)

from the *New International Version of the Bible*, and is found in the First Book of Samuel, Chapter 17, verses 40-54:

Then he took his staff in his hand, chose five smooth stones from the stream, put them in the pouch of his shepherd's bag and, with his sling in his hand, approached the Philistine. Meanwhile, the Philistine, with his shield bearer in front of him, kept coming closer to David. He looked David over and saw that he was only a boy, ruddy and handsome, and he despised him. He said to David, "Am I a dog, that you come at me with sticks?" And the Philistine cursed David by his gods. "Come here," he said, "and I'll give your flesh to the birds of the air and the beasts of the field!" David said to the Philistine, "You come against me with sword and spear and javelin, but I come against you in the name of the Lord Almighty, the God of the armies of Israel, whom you have defied. This day the Lord will hand you over to me, and I'll strike you down and cut off your head. Today I will give the carcasses of the Philistine army to the birds of the air and the beasts of the earth, and the whole world will know that there is a God in Israel. All those gathered here will know that it is not by sword or spear that the Lord saves; for the battle is the Lord's, and he will give all of you into our hands." As the Philistine moved closer to attack him, David ran quickly toward the battle line to meet him. Reaching into his bag and taking out a stone, he slung it and struck the Philistine on the forehead. The stone sank into his forehead, and he fell facedown on the ground. So David triumphed over the Philistine with a sling and a stone; without a sword in his hand he struck down the Philistine and killed him. David ran and stood over him. He took hold of the Philistine's sword and drew it from the scabbard. After he killed him, he cut off his head with the sword. When the Philistines saw that their hero was dead, they turned and ran. Then the men of Israel and Judah surged forward with a shout and pursued the Philistines to the entrance of Gath and to the gates of Ekron. Their dead were strewn along the Shaaraim road to Gath and Ekron. When the Israelites returned from chasing the Philistines, they plundered their camp. David took the Philistine's head and brought it to Jerusalem, and he put the Philistine's weapons in his own tent.

Using our template, the cause and effect mapping of the Biblical story appears in Figure 2.

David and Goliath

<i>Cause</i>	<i>Effect</i>
<i>David slings stone at Goliath and hits him in the forehead^{C1}</i>	<i>Goliath falls and is killed^{E1}</i>
<i>Goliath falls and is killed^{C2}</i>	<i>Philistine army sees Goliath's death panics and runs^{E2}</i>
<i>Philistine army sees Goliath's death panics and runs^{C3}</i>	<i>Israel's army sees Philistines break and run; Jews pursue and rout Philistine army, killing many and taking spoils^{E3}</i>

Figure 2. Cause and Effect Mapping

“Planners must have some way to bound, scope, or otherwise limit the examination of cause-effect chains to those most important.”

Points to Consider

As this example illustrates, we must consider several points when trying to determine what 2nd and 3rd order effects may occur as a consequence of our actions. First, it is imperative to try and determine, to the maximum extent possible, the precise effect induced by the first causal action. Remember that Effect¹ will become Cause² and thus the basis for the rest of the cause-effect chain, and the resulting 2nd and 3rd order effects. In our Biblical example, David had to have been sure that the stone would fly true and impact Goliath in an unprotected area (Cause¹), thus causing him to fall (Effect¹). Since it happened this way in the Biblical account, we must presume that this was the intended cause-effect sequence. Notice that David took all steps necessary to insure his desired tactic and weapon of choice were effective. Through his words, David incited Goliath (*please note the effective use of psychological operations*) to run at him. Goliath, his judgment clouded by overconfidence and his anger at David's words, began to charge his opponent. Goliath was running a predictable path toward David, making this a head-on engagement where Goliath's closing speed adds to the slung stone's velocity. Had Goliath remained static, perhaps he would have more easily dodged a stone hurled at him? Further, David pre-selected his stones (probably oval-shaped, highly aerodynamic brook stones of uniform size) and had them at hand in his shepherd's bag, along with his sling. When David hurled his stone, having combined psychological operations and the supporting capability of physical attack, it found its mark. The point is David structured the conditions of the engagement as best as possible to insure he attained his desired outcome. In our modern world, computer-based models and simulations of various competing strategies, courses of action, and weapons system measures of performance help us do the same thing.



Strategic discussions demand a careful look at long range causes and effects (Defense Link)

There was also the question of strategy. In countering Goliath, conventional military wisdom would have been to have a mighty (and hopefully really big!) Israelite fighter meet Goliath in hand-to-hand combat. Indeed, this is what Goliath had suggested earlier in the Biblical account. Instead, Israelite Army Commander King Saul chose a different tactic based on David's expertise with the sling, and a confidence born of realistic training and operational experience. Instead of employing a weapons suite comprising a physically strong fighter armed with sword, shield, and personal armor, he decided instead on a sort of Israelite "missile engagement," designed to compensate for an opposing force's advantage.

Finally, let's examine the 2nd and 3rd order effects. Notice that in the Biblical example, the Philistine army, seeing that Goliath had fallen and was dead (Effect¹ and now Cause²), panicked and ran (Effect²). We could have just as easily postulated another potential Effect²: that the Philistine army, seeing Goliath's death, would engage the Israelite armies and fight furiously to avenge their fallen champion. This sort of Effect² (which would become Cause³) might well have given rise to a completely different Effect³. Our methodology suggests that for simplicity's sake, we only identify one potential effect of our actions at a time. The methodology, though, can certainly be used on a variety of potential cause-effect pairings that can later be viewed in the aggregate. Finally, note that Effect² and Effect³ in our example were favorable to the Israelite Army Commander's overall objectives. If we found these projected 2nd and 3rd order effects of Effect¹ running counter to the commander's objectives, our methodology would have King Saul re-examine the nature of the proposed David-versus-Goliath engagement.

Summary

So, we can make three major points concerning our thinking about 2nd and 3rd order effects:

- Identifying and assessing the consequences of 2nd and 3rd order effects can be done
- Assessing potential 2nd and 3rd order effects will most likely produce an "about right" instead of an "exactly right" picture of the cause-effect chains. Because the chain development process is a complex endeavor with many variables, commanders must therefore be prepared to deal with "about right" assessments
- Thinking through the problem is a prerequisite to employing analytical tools that can help refine the problem, and ease the analysis

Like our Biblical David, planners responsible for crafting branches to the commander's basic plan must ultimately "struggle with their own giants" to insure we consider the most likely range of 2nd and 3rd order effects. This article attempts to present a simple, yet useful method for thinking about the problem. Hopefully it will ease the way of planners, who must ensure the "fog of war" only slightly limits our view of the future. 🕒

"First weigh the considerations then take the risks"

- Field Marshall Helmuth Von Moltke (the elder)