On Intelligence, Part I

Why does intelligence work?

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"Why does intelligence work?" is a question so simple it seems not worth asking. Even junior intelligence Marines know it by heart: the enemy gets a vote; we avoid strengths and strike at weaknesses. So why go through the exercise?

Understanding or accepting that these things are true is sufficient for the lance corporal or second lieutenant. Junior Marines must accept some things (relatively) uncritically to operate effectively and gain the operational experience and context that allows them to then critically reflect. But that critical reflection—understanding *why* or *how* these things are true—is the professional responsibility of any senior intelligence Marine.

Like Clausewitz's dialectic, asking two questions that are in tension can help us synthesize a greater truth or understanding that can bind them together. Quickly exploring the two questions "When is intelligence important?" and "When is intelligence unimportant?" will set up a conversation about game theory that helps us understand why intelligence works.

When is Intelligence Important?

Our philosophy of warfare

> aims at taking action which avoids enemy strengths and exploits enemy critical vulnerabilities. The identification of these strengths and vulnerabilities is crucial. [This] requires acting in a manner to deceive and then striking at a time and place which the enemy does not expect and for which he is not prepared.[1]

This is fairly straightforward. We want to bend the enemy to our will. Intelligence gives us the information to know how, where, and when to do those things as well as what environmental factors will be at play. It is no surprise then that *MCDP 2, Intelligence,* spends only two pages explaining the important of intelligence.

Unfortunately, it does not actually provide a theory for how intelligence works.

When is Intelligence Unimportant?

No one would argue that intelligence was not involved in Operation DESERT SHIELD/DESERT STORM (ODS/DS). We can all conjure images of precision-guided munitions dropped from stealth fighters exactly onto their targets. All those coordinates must have come from an intelligence section somewhere.

But for tactical intelligence (the level with which we are predominantly concerned in the Marine Corps), the fallout from ODS/DS was traumatic. In the years that followed, professional journals, official histories, congressional testimony, DOD inquiries, and other venues bore witness to many of the shortfalls.

GEN Norman Schwarzkopf, USA, Commander of U.S. Central Command during the Gulf War, testified to Congress that while collection efforts were satisfactory and all the technical information was generally present and correct, the presentation of intelligence in a form useful to the commander was dismal. One example he provided was a report that a 4-span bridge was "52% [percent] destroyed." The report did not indicate if one half of each of the 4 spans was destroyed (100 percent functionally destroyed) or if only 2 spans were destroyed (functionally operable at 50 percent throughput).[2]

There are legitimate complaints with this simplistic characterization, but this article is not *about* these failures. Let us simply stipulate: intelligence in support of commanders' tactical decision making was irrelevant to (or at best a bit player in) the success tactical units enjoyed.

We are left with the obvious question: If tactical intelligence was out to lunch, then how did U.S. forces defeat the fourth largest armed force on the planet in a completely lopsided air campaign and a stunningly quick and relatively bloodless ground campaign?

No one would expect an entire MEF to succeed as one-sidedly as it did without an effective tactical intelligence apparatus. But this was the case.

This question (How could we have won without tactical intelligence?) brings us to the need to understand *why* intelligence works.

Why Does Intelligence Work? Col Blotto Explains

The "Blotto game," a classic of game theory, offers a model for understanding competitive resource allocation and has been used to describe resource allocation strategies from war to political campaign spending.

Any *model* simplifies interactions that are, in reality, richer and more complex. But simplification can help us understand general features or characteristics and carry that knowledge into the rich and complex world of reality.

The game was first proposed in 1921 and earned its "Blotto" moniker after a 1950 paper that gave the fictional names Colonels Blotto and Lotso to "players" facing off in the game over multiple pieces of key terrain.

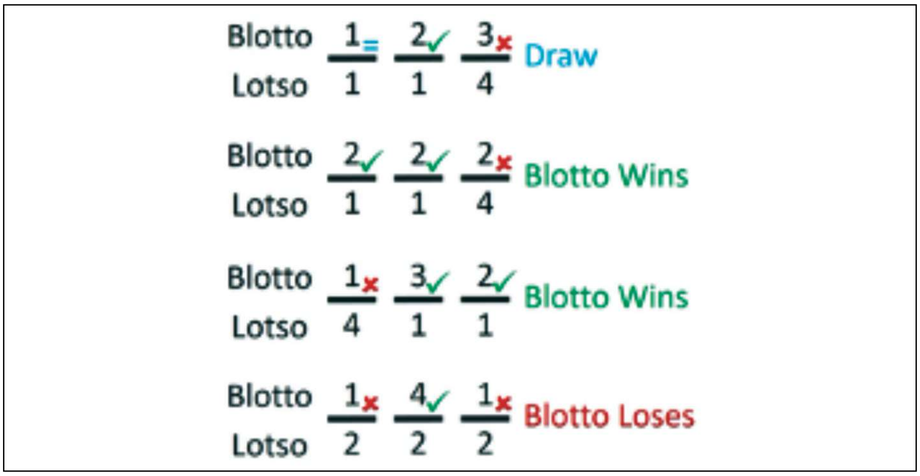

Figure 1. ***(Figure provided by author.)***

The game goes like this:

Two adversaries face off across three fronts. Each has a number of units of force, *S*, with each unit of force considered to be equivalent. Each "player" allocates these units of force across three fronts. On any given front, a preponderance of forces wins; equivalent forces draw. A player who wins more fronts wins the game.

The simplest form of the game allocates each player six units of force (*S*=6). When *S*=6 there are three resource allocation strategies:

- A: (1, 2, 3) with its 6 permutations.
- B: (1, 1, 4) with its 3 permutations.
- C: (2, 2, 2).

When each strategy is played against itself, it results in a draw.[3] A versus B results in A winning one-third of the time and drawing two-thirds of the time.[4] A versus C always results in a draw. And B versus C results in a loss for B. Overall:

- A almost always draws but can win against some permutations of B.
- B almost always draws but can sometimes lose against A.
- C always draws against A but always wins against B.

Figure 1 depicts a few of these games.

Because B can never win, there is no reason to pick it. Because C wins more reliably than A and neither wins against each other, there is no reason to pick A over C. C is therefore the *dominant strategy*. Because there is a single dominant strategy, every player will always pick C. And every game is a draw.

When *S*=6, the Blotto game seems about as interesting as a game of tic-tac-toe and one struggles to see the lessons it teaches about intelligence in warfare.

High-Value *S* Games

When *S* grows much above twenty, winning becomes more or less random—*unless you know what resource strategy your opponent will use*. The literature around the Blotto game does not discuss the role of intelligence, per se, but for our purposes, this is where it comes in.

For large values of *S*, so long as opponents are at least somewhat similarly resourced, it is trivial to devise a winning strategy as long as you know your opponent's strategy. If your opponent has 99 forces and fields them evenly (33, 33, 33), it is possible to win with just over 2/3 of your opponent's forces (0, 34, 34). If your opponent fields 100 forces as (70, 20, 10), it is possible to win with less than 1/3 of your opponent's forces (0, 21, 11).

Blotto Does Asymmetry

The original form of the Blotto game assumes that force units are equivalent (i.e., symmetric). But we know this is not always true—in fact, it is rarely so. Thus, if we accept that forces have a different "value" in the game under different conditions, we can describe different asymmetries in the battlespace.

Asymmetry can derive from tactics. Defense and offense are forms of asymmetry—as are the tactics of insurgency.

Weapons can provide asymmetry. An M-16 has a maximum effective range of 550 meters, an AK-47 only 400 meters.

Environments can impose (or eliminate) asymmetry. The asymmetric range advantage of the M-16 may be nullified by the close-in fights of a jungle battlefield.

Training- or experience-level can provide asymmetry. Imagine a platoon of professional soldiers in combat against a platoon of conscripts.

In the Blotto game, we can think of asymmetry as a force multiplier (or divisor). In open plains, 1 platoon of M-16-wielding Marines might be worth 1.4 platoons of AK-47-wielding enemy. In a jungle, the two platoons might be equal.

Blotto Does Tempo

At TBS, instructors explaining the concept of avoiding strengths and attacking vulnerabilities often use the example of two boxers facing off, designating one lieutenant as the notional enemy. When the instructor side-steps and "flanks" the lieutenant, that lieutenant may simply pivot to face the instructor and quip "why wouldn't the enemy turn so that a flank becomes a front?" This troublesome lieutenant has a point. The answer is tempo. Tempo is "speed over time" *in relation to* the enemy. In the context of the Blotto game, this is the speed of adjusting resource allocation strategies.

If the Blotto game is iterated and we imagine that (as in reality) resources cannot be instantaneously and arbitrarily moved across the battlefield but only over time (as in a campaign), we see tempo at play. In an iterated game, as long as one player can adjust resource allocation strategy more dynamically than their opponent, initial losses can be compensated for by adjusting future resource allocation (or changing to an asymmetric strategy).

We begin to see the obvious value intelligence (estimating the opponent's resource allocation strategy) has in supporting operations (i.e., Blotto's decision making).

Blotto's Three Categories of Conflict

We can devise at least three categories

of conflict in which to apply the Blotto game.

First, when we consider symmetric competition against adversaries with comparable resources, the high-value *S* version of the Blotto game is played out. Recall that in high-value *S* games, victory is more or less random unless one side has a competitive intelligence advantage (i.e., less uncertainty about the adversary's resource allocation) or tempo advantage (i.e., more rapidly respond to initial rounds of an iterated game). By definition, intelligence applies in the first case. In the second case, it is easy to see how intelligence contributes to faster observation of a shifting enemy strategy (i.e., more rapid sensing and sense making) or faster and more efficient force reallocation (i.e., identifying more rapid or flexible routes for maneuvering forces).

Second, when we consider asymmetric competition (whether against state or non-state actors), the value of forces becomes more variable. For example, when modeling a *symmetric* tank engagement, one U.S. tank might be worth one enemy tank. When we seek and acquire more capable weapon systems, we are seeking to increase the "value" of our forces, hoping that one U.S. tank is actually "worth" two enemy tanks. The *asymmetric* example might find, however, that four tanks equals one improvised explosive device cell, allowing a village with two insurgent improvised explosive device cells to compete and win against a U.S. force of one tank platoon.

The example is simplistic, but it allows us to see that when this force multiplication effect is applied to *asymmetric* competitions, it can change the nature of the competition so as to make it more like a high-value *S* version of the Blotto Game (where any strategy can be defeated). It is in this way that a poorly equipped insurgent force measured in the thousands or tens of thousands can effectively compete against a well-equipped coalition force measured in the hundreds of thousands. Similar logic extends to great power competitions by proxy war or competition below the level of open conflict.

In both of these versions of the game (comparable resources employed symmetrically and differential resources employed asymmetrically), there are no dominant resource allocation strategies. There are only resource allocation strategies that can win against *specific other* strategies. Victory can only be achieved *in the context of the enemy,* thus highlighting both the importance of intelligence and *how* it enables victory.

It is only when we look at a third category of conflict where we see "certain victory." When an opponent is at a measured resource disadvantage and chooses to compete symmetrically, a resource-rich player can be assured of victory.

Imagine that 1991 Iraq has 32 "units" of resources and chooses to compete symmetrically. While coalition forces may not significantly outnumber the Iraqi army, "second offset" technological advantages act as force multipliers. If the coalition can bring to bear 99 units (33, 33, 33), it is assured complete victory on *all* fronts regardless of the Iraqi strategy. (One can argue this describes ODS/DS, hence explaining why dismal tactical intelligence did little to hinder the most lopsided military victory in history.)

Incidentally, this instantiation of the Blotto game also helps us understand why our defense budget might be a rational resource allocation strategy. Some commentators decry the fact that the U.S. defense budget is larger than the next seven nations' defense budgets combined. But if the only way to be assured victory is to present adversaries with this strategy-agnostic resource overmatch, then this outrageous level of funding actually makes a lot of sense. (The geographic asymmetry of our global interests versus the regional interests of our strategic competitors is another way the Blotto game can explain the defense budget.)

One might reasonably ask whether, if our resources *still* cannot effectively compete with a resource-starved asymmetric force such as the Taliban, *true* resource overmatch is too expensive to be feasible. Or one might suggest that rules of engagement are force divisors (i.e., relatively small colonial forces had little trouble temporarily subjugating many parts of the world, including Afghanistan, in part because they were not limited in their means). Answering these questions is the strategic art of matching ends, ways, and means.

None of this is to suggest the Blotto game is a comprehensive and accurate way to understand the nature of competition. It does, however, help us understand the importance of intelligence to the resource allocation and resource comparison *dimensions* of competition and, therefore, strategies for competitive engagement.

The Role of Intelligence

At this point, the intelligence implications of the Blotto game should be obvious.

Returning to *MCDP 2*, our warfare philosophy

> aims at taking action which avoids enemy strengths and exploits enemy critical vulnerabilities. The identification of these strengths and vulnerabilities is crucial.[5]

When interpreted in the context of the Blotto game, we see that such a warfare philosophy is *impossible* without intelligence. Because high-value *S* games result in victory only randomly, any commander, without intelligence, can only hope to defeat an opponent by luck.

The authors of *Front-line Intelligence*, written in 1946, understood this and make the point explicitly:

> The commander's decision is based upon the mission as affected by the following: 1) Enemy to be dealt with in accomplishing the mission. 2) Terrain over which the operation must be conducted. 3) Weather to the extent that it may affect the operation. 4) Means available for the execution of the mission within the time limitations.[6]

As the first three factors rely entirely on intelligence, they conclude, "without combat intelligence a commander has no *right* to issue a combat order" (emphasis added).[7]

Intelligence offers insight into the enemy's resource allocation strategy, informing the commander where he should allocate friendly forces to compete. That said, intelligence's role is not to *precisely* identify the opponent's strategy. The certainty to say, "The opponent will choose (70, 20, 10)," is unrealistic. But perhaps intelligence can say with reasonable certainty the opponent has 80–100 forces and that it has confirmed a force distribution of at least (60, 10, 10). This means intelligence can estimate that (60–80, 10–30, 10–30) is the possible force distribution and advise the commander to counter with at least (0, 31, 31) for a minimum victorious force.

Intelligence also provides insight into the factors that act as force multipliers/divisors, allowing commanders to more accurately "do the math." An ill-informed commander may see reports of a 100-fighter insurgent force in a village and commit two 178-Marine rifle companies to achieve a 3:1 force ratio. When intelligence identifies the asymmetric strategies of an insurgency, that commander will better understand that "enablers" and employing counterinsurgency doctrine are needed to "balance the equation."

These are simplistic examples to make the point. But to use doctrinal terminology, what we are discussing are *decision points*: a point in space and time where a commander must make a decision about a course of action. Using the language of the Blotto game, we might say "where a commander must make a *resource allocation* decision (i.e., risk)." Thus, this understanding of *why* and *how* intelligence works, allows us to better identify *and frame* likely decision points and to prioritize intelligence efforts where resource allocation (i.e., risk) decisions must be made or where they are most acute.

(The Blotto game can also help us understand why *counterintelligence* works. By masking or misrepresenting our true resource allocation strategy, counterintelligence can actually cause the enemy to adopt a suboptimal strategy, giving friendly forces an increased advantage or victory without having to change our own resource allocation strategy.)

This also explains why intelligence and operations have the close and integral relationship that they do (even if we sometimes fail to practice it). The other staff sections support and are critical enablers of operations but not in the same way. The fuel or parts the S-4 brings to the fight enable or serve as limitations to what operations can do. The ability to communicate that the S-6 brings to the unit enables or limits command and control. But neither factor into what operations *should* do or *how* it should respond to battlefield conditions. They serve as parameters that draw a "box of the possible" for the S-3 to operate in. They do not help make decisions about what to do or where to go within that "box." The S-2 does. This is why we elevate operations/intellegence integration above other intra-staff relationships.

And finally, the Blotto game guides where intelligence at any given echelon should focus. If the "resource units" at the regiment are battalions, the regimental S-2 should focus on the operational factors that inform the employment of those battalions. If the "resource units" on a MEU (which often lacks an enduring battlespace and thus the independent authority to commit forces) are husbanded forces and alert status, the MEU S-2 should focus on tactical factors that affect those rather than attempting to answer the "false" decision point of "when to launch" (which may often be held at higher echelons).

This seems obvious enough, but it helps describe *why* a MEU S-2 must focus on different questions than a regimental S-2 that owns battlespace or *why* tactical and operational intelligence differ in nature. At the operational level, tactical granularity becomes less relevant than overall *trends* on the battlefield. This is in part because of the size of "resource units" being applied at the operational level but also in part because of the comparatively slower rate of change at the operational level in terms of adjusting resource allocation strategies.

Stated another way, the regimental S-2 should not care about where the enemy's machine guns are (that is the battalion S-2's concern), but rather how many enemy companies are in the sector, whether contact reports are probes in advance of a striking force, or what the trends from tactical intelligence reporting mean in terms of where the enemy has focused their main effort.

Let the Game Theory Begin

No one game theory game can explain the complexities of warfare. But understanding the *what* and the *how* of our craft is only the beginning. We should seek to understand the *why*.

After all, this is the entire premise of mission command. Give your subordinates the why (intent) and they will be able to exercise the initiative to fight and win in the chaos and complexity of the battlefield.

Phrased this way, one is left to wonder why we don't have a more academic appreciation of our craft, leveraging entire disciplines (such as game theory) that have been created to explain major features of the competition we engage in and train for.

What does game theory have to offer operations or logistics?

Why do our foundational philosophies (*MCDP*s) skip the *why* and start with the *what* and the *how*?

In addition to sending Marines off to get advanced degrees in international relations, public policy, and history, should we also send them to get degrees in economics and game theory?

Areas for further study, perhaps.

Notes

1. Headquarters Marine Corps, *MCDP 2, Intelligence,* (Washington, DC: 2018).

2. U.S. Congress, House Armed Services Committee, *Intelligence Successes and Failures in Operations DESERT SHIELD/STORM*, 103rd Congress, 1st session, (Washington, DC: 1993).

3. Some permutations of strategy A win against itself but these wins are symmetric (for one permutation of A to win, another permutation loses). So probabilistically, A draws against itself. B and C always draw against themselves in any permutation.

4. The 6 permutations of A and 3 permutations of B result in 18 ways the two strategies can be played against each other, 6 of which result in a loss by B and 12 of which result in a draw.

5. *MCDP 2, Intelligence.*

6. LTC Stedman Chandler and COL Robert Robb, "Front-Line Intelligence," (Washington, DC: Infantry Journal Press, 1946).

7. Ibid.