Robert Axelrod: "The Rational Timing of Surprise"
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The article deals with the theorizing the use of surprises in wars. Axelrod offers a mathematical model and qualitative lessons on when a resource for surprise should be exploited.

The timing of the exploitation of a surprise is crucial for several reasons:

- Stakes vary significantly from one event to another
- It is frequently necessary to pay significant costs to maintain a resource for surprise.
- Surprise is frequently possible only by risking the revelation of the means of surprise (and, more often than not, those means can only be used once)
- Value is discounted over time: because the resource may disappear even if not used and because a gain today may accumulate in its impact over future events

The problem then is to decide when the resource for surprise should be risked and when it should be maintained for a later, potentially more important event.

5 resources for creating surprise in the opponent can be identified: double agents, standard operating procedures, cracked codes, spies, and new weapons. The first two resources rely on deception, the last three rely on having information on your opponent he doesn't know about.

To model the problem of the timing, Axelrod draws a parallel with a gambling game, where the problem is basically the same: at each point in time there is a conflict between the desire to exploit the resource immediately for its potential gain, and a competing desire to pay the necessary cost to maintain the resource in the hope that an even better occasion for its use will come along soon.

The model represents the expected payoffs that can be achieved if the decision is made to exploit the resource whenever the stakes are at least as great as some given threshold level. Finding the best threshold, then, is identifying the best timing for using the resource.

The components of the model take into account the "reasons why the timing is crucial" listed above:

- The stakes (distributed just as the wars have been, with many relatively small events and a few very large ones)
- The enhancement factor (basically, what part of the stakes can be captured)
- The cost of maintaining the resource
- The survival rate of the resource
- The discount rate of the resource

The most striking conclusion this models leads to is that even with relatively high survival rates and discount rates, the resource only should be used for events where the stakes are the highest (typically, the top 5% most important events). Several policy implications derive from his model.

Patience is a virtue: the best strategy is to wait for rare events with very high stakes before exploiting a resource for surprise. This means also that patience should be rewarded and that small but repeated small losses should be accepted.[1]
Since surprises should only be used for big events, it would be a mistake to evaluate the opponent's resources for surprise by what you have seen when the stakes were low or moderate. When making inferences, one should then keep in mind that the rules of inference are *very* biased.
By the same token, when stakes get very large, a great deal of surprise can be expected. This is why nations can be overconfident about their ability to predict the actions of their potential opponents: they forget that being able to predict when the stakes are low does NOT provide a good reason to believe that prediction will be good when the stakes are high. The difficulty of predicting when stakes are high increases uncertainty and, in turn, could help strengthen the stability of deterrence (but only if people are aware of their inability to predict when stakes are high)
When stakes are low… less surprises should be expected, and particularly after a very high-stake situation, when one can assume that the resources for surprise have already been used. The rules for the exploitation of surprise can (and should) be developed in advance, particularly when speed of reaction is of utmost importance

Finally, as technology improves, the potential for surprise and deception does NOT necessarily become less. The more you observe, the more you think you "know", the more you can be surprised.

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It is not possible to read this article without having Sept. 11th in mind. Sadly enough, the events proved Axelrod's analysis right, and his last point sounds bitterly true.

The intellectual ambition of the article is not exceptional, and most of its conclusions are commonsensical.
Still, it is a very good article, in my view, for four reasons. First, it is very clearly written, with a neatly delineated problem and a transparent argumentation. Second, it successfully combines historical illustrations, a quantitative model, and qualitative results. Third, its conclusions are not only clear (use your resources for surprise only when the stakes are very high), they also point out to significant mistakes 'common sense' could lead to, notably the asymmetry of the likelihood of the use of surprises when stakes are high and low, which make simple Bayesian inferences wrong and create a deceptive sense of security.
Altogether, from an academic, theoretical point of view, I am tempted to say: "Next! Now we know what this stuff is about" and this is what research should aim at. But it is not enough to write things on paper to make them 'work' in reality. As we know.

[1] The best illustration of this is the use the British made of double agents during World War II, giving them accurate information for *years* in order to preserve their credibility until D Day.