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Anticipation and Conflicts

Roberto Poli

University of Trento

Contents

1. Approaching Anticipation

The connection between anticipation and conflicts has been well known since the early days of conflict studies. In fact, the difference between defensive and aggressive conflicts is often articulated in terms of anticipations, as shown by the way in which the basic types of conflicts are usually defined:

- *Defensive conflict* = when the initiating contendant tries to avoid an *anticipated* loss.
- *Aggressive conflict* = when the initiating contendant tries to acquire an *anticipated* gain.

Furthermore, it is often assumed that power is a scarce resource, i.e. that "what he loses, I gain" (see (Coleman, Fisher-Yoshida, Stover, Hacking, & Bartoli, 2009)). If power is indeed a scarce resource, the obvious consequence is that contendants will try anything to have more of it.

To date, conflict studies have taken it for granted that the idea of anticipation is sufficiently clear and does not require further analysis. This paper, however, intends to show that anticipation is far from being properly understood and has unsuspected complexities. Indeed, the theory of anticipation has many surprises in store.

Conflicts, as based on anticipations, embody people's habits, dispositions, tendencies, and attitudes – and none of these are well understood, to say the least. Much more is there, however: for systems which are able to anticipate behave in a much more sophisticated way than systems without such a capacity.

Before continuing, it is time to ask the main question: What is anticipation? The short answer is: Anticipation is future-based information acting in the present situation. The simplest way to understand anticipation is to think about the projects, plans and aims that persons may have. Occasionally some of these may even operate in an implicit way, i.e. below the threshold of consciousness.

The somewhat longer answer states that anticipation has two aspects: (1) the system has an idea or model of its future development, and (2) it uses the information related to that idea or model to take its decisions in the present moment. If, according to the values accepted by the system, the model projects a *positive* evolution of the system, the system tries to realize the projected development; on the other hand, if the model projects a *negative* evolution of the system, the system may try to modify its trajectory (Poli, 2009).

Many more details need to be added to this first outline if a reasonable picture is to be developed. For instance, the system may know that it is heading towards a negative outcome, but it may feel unable to change its behavior, or it may reject the very idea of changing behavior. Or the anticipatory model may be wrong and may take for positive outcomes ones that in reality are negative, or the other way round.

The first groundbreaking systematic study of anticipation has been (Rosen, 1985). After years of neglect, interest in his ideas is regaining momentum. Two collections of essays discussing some of his contributions have been recently published: (Baianu, 2006), (Mikulecky, 2007). For an introduction to the subtleties of anticipatory systems see, in the given order, (Louie A. , 2009), (Louie A. H., Functional Entailment and Immanent Causation in Relational Biology, 2008), (Louie & Kercel, Topology and Life Redux: Robert Rosen's Relational Diagrams of Living Systems, 2007). For a general overview of research on anticipation, see (Poli, The Many Aspects of Anticipation, 2009), for an in-depth analysis of the theoretical nature of anticipatory systems see (Poli, The Complexity of Anticipation, 2009).

This paper will focus only on the simplest aspects of anticipation, leaving further developments for other occasions.

2. Types of Anticipation

Anticipation comes in different guises. The widest distinction is between explicit and implicit types of anticipation. Explicit types of anticipation can be used synonymously for prediction and/or expectation, while implicit types of anticipation are properties of the system, intrinsic to its functioning. In this regard, we may ask whether we are "consciously creating anticipations on basis of which we plan and make decisions, or are anticipations and decisions making made for us? (Riegler, 2003, p. 11).

Secondly, the distinction between anticipation as a simple looking into the future and anticipation as the capacity to take account of the consequences of that looking, i.e. its impact on current behavior, is worth considering. This second distinction may appear to be trivial, yet many conflicts spring from a kind of blindness to the consequences of the actions performed.

The most efficient way to learn how to foresee each other's reasons and actions is to devise forms of institutionalization of the agents' expectations. Institutionalization lowers uncertainty, and less uncertainty raises confidence. "Instead of getting overwhelmed by the details of a new situation, humans seek to replace them with familiar activity and behavioral *patterns* that show a high degree of predictability to putatively gain control again, to be able to anticipate the outcome" (Riegler, 2003, p. 12).

The problem with institutionalization, however, is that it generates forms of blindness towards whatever does not match its internal codes. Institutionalized behavior may not be able to detect what futurists call 'weak signals', namely early and usually minor behavioral differences that may eventually grow and become new behavioral patterns.

Furthermore, consideration should be made of the distinction between anticipation as a descriptive feature exhibited by some systems and the conditions that the system should possess in order to make anticipation possible (on the difference between anticipation as a descriptive feature and the conditions that make anticipation possible see (Poli, The Many Aspects of Anticipation, 2009)).

Moreover, no description is able entirely to capture an anticipatory system. Side effects are a structural feature of anticipatory systems. By default, when the system carries out a particular activity, it uses only some of its internal resources (technically speaking, only some of its degrees of freedom). Side effects are due to the tension between the fact that the system's dynamics characterize it as a whole (the equations of the system's motion link all the variables defining the system) whilst the system's functional activities require only some of its variables. The variables not involved in any particular functional activity are therefore free to interact with other systems in a non-functional way, and even in a dysfunctional way (see the reconstruction presented by (Poli, An Introduction to the Ontology of Anticipation, 2009).

A major consequence is that activities will in general have effects on a system other than those which are planned. However, there are often typical ways in which a system can go wrong. It is therefore possible to develop diagnostic tools and devise appropriate responses.

3. The Functional Structure of Anticipation

The simplest scheme of an anticipatory system is shown by Figure 1 below, where an anticipatory system is composed of three parts: a normal (i.e. not anticipatory) system S, a model M of S, and a steering device D able to steer S according to the outcomes of M.

The only internal condition is that the model should be able to run faster than the system itself. In this way the model can precalculate the evolution of the system S. Providing that the entire system has the capacity to distinguish positive from negative states, when the model detects that the system is running towards a negative state, it may order the steering device to modify the system's trajectory. If instead the system is running towards a positive state, the model tells the steering device to maintain the system's dynamic trajectory. This description of an anticipatory system is simple, but it is nevertheless helpful because it enables us to distinguish some of the typical ways in which an anticipatory system may fail. For instance, it may fail because the model is inadequate and need updating, or it may fail because the steering device is unable to steer the system ((Poli, An Introduction to the Ontology of Anticipation, 2009).

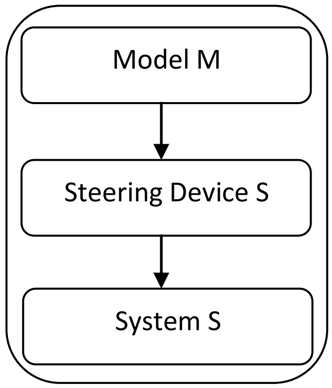

Figure 1. The internal configuration of an anticipatory system

Anticipation can be understood at two different levels of abstraction. The simplest approach is to ask which types of controllers make anticipation possible. On considering the problem of the regulatory structure that a system may have, Rosen was able to distinguish five different types of controller. In order of complexity, the five cases are the following:

1. System with feedback controllers.
2. System with feed-forward controllers.
3. System with feedback controllers with memory.
4. System with feedforward controllers with memory.
5. System with general purpose controllers.

Feedback controllers "perceive" the system's environment. The most important characteristic of feedback controllers is that they are special purpose systems: for them only highly selected aspects of the environment are relevant. Given some selected value, feedback controllers steer the system in order to force it to maintain that value. This is achieved by error signals indicating the difference between some fixed value and the actual value of the selected environmental variable. Within limits, the controllers in this family neutralize environmental variations and are able to keep the system stable. Their main limitation is due to the delay between environmental change and system adjustment: if the changes in the environment happen too rapidly (the exact meaning of "too rapidly" depends on the type and sensitivity of the controller) the controller ends up by tracking fluctuations and rapidly loses its capacity to steer the system.

Unlike feedback controllers, feedforward ones "perceive" the controlled system, not the environment. The simplest way to imagine a feedforward controller is to think of a model of the system, as in Figure 1 above. In other words, a material system with a feedforward controller is a system containing a material model of itself. In order to behave as a feedforward controller, the model should run at a velocity faster than the velocity of the system. In this way the model anticipates the possible future state of the system.

The third class of controllers comprises feedback controllers with memory. If a feedback controller is able to leave a trace of the system's experience, this memory trace can be used to tune the system's behavior better. A system with this capacity is obviously able to learn from its past experience.

The next class of controllers consists of feedforward controllers with memory. As in the previous case, systems of this type can learn from their past experience. Rosen notes that systems of this type – "ironically", he says – must use feedback controllers of type 1 for their operations. In fact, they must be able to work on deviations from predicted states (i.e., they need error signals, exactly like type 1 controllers).

The last type consists of systems with general purpose controllers. All the controllers discussed so far can be described as working on single types of "perceptions" or variables. The obvious next step is to let systems behave in as articulated a way as possible (i.e., exploit as many variables as possible). The only constraints are given by the unavoidable need to use feedback controllers to modify the internal models of systems with type 5 controllers (Poli, The Complexity of Anticipation, 2009).

On a higher level of abstraction, one forgets all the details concerning the nature of the controllers and considers only the functional connections internal to the system. What emerges in this case is that an anticipatory system presents hierarchical loops between the underlining system S, the model M and the steering device D. This implies that all the relevant information is generated internally to the system. The environment may eventually act on the system as a trigger for actions, not as a source of information (Luhmann, 1995). As surprising as they are, hierarchical loops (or impredicativities as they are called in logic) mean that the system generates internally its own meanings. An anticipatory system is a system able to generate its own behavioral codes, and the formal side of this capacity is provided by hierarchical loops.

Those systems that are capable of observing their own behavior can use this information to generate new structure. This is done by adding self-observations to the hierarchical S-M-D cycle. The observational re-entry that generates structure constitutes the second level (or cycle) of autopoietic reproduction of an anticipatory system (Poli, The Complexity of Anticipation, 2009).

4. Do Anticipations Change?

An organism's *schemata* determine how it looks at the environment. They are therefore anticipatory. Schemata construct anticipations of what to expect, and thus enable the organism to *actually perceive* the expected information. Construction imposes anticipations and poses the question of how to construct.

Most anticipations work as acquired habits either through evolution (as in biological anticipation) or learning (as in most cases of psychological and social anticipation). Evolution-based anticipations are difficult to change, for obvious reasons. However, as difficult as they are to change, they may evolve, and this raises the question as to whether we can eventually bend evolution in some or other direction.

According to the theory of anticipation, behavior is almost always *goal-oriented* rather than being *stimulus-driven*. Anticipation runs contrary to the claim that psychic processes in general are determined by stimuli (i.e. it is at odds with both Behaviorism and most of current Cognitive Psychology) (for some data, see (Poli, The Many Aspects of Anticipation, 2009)).

If behavior is indeed goal-oriented, this implies that changes in behavior are filtered by the system's identity (seen as the second entry in the system's autopoietic cycles). The reason for this is straightforward. Anticipation is based on feedforward controllers, i.e. on controllers that detect and control the system itself. Changes in the system's working (i.e. in its identity) are therefore projected by feedforward controllers into new anticipations. From this basic dynamic of the system it follows that the most productive strategy to change the anticipations that a system may have is to modify the system's dynamic identity.

5. Anticipation and Levels of Reality

Anticipation works at many different levels (and sublevels). The least we can assume is that there are biological anticipations, psychological anticipations and social anticipations (on the theory of levels of reality see (Poli, The Basic Problem of the Theory of Levels of Reality, 2001), (Poli, Levels of Reality and the Psychological Stratum, 2006), and (Poli, Three Obstructions: Forms of Causation, Chronotopoids, and Levels of Reality, 2007)). As far as conflicts are concerned, the most relevant types of anticipation are obviously the psychological and social ones.

Some anticipations are explicit, meaning that the system knows that it has them. On the other hand, it is patently obvious that most anticipations work silently: they constrain the system's behavior without the system being aware of them. Given the connection between anticipation and identity sketched in section 4 above, this implies that the system knows only some fragments of its own identity.

The main problem with such an extensive family of anticipations is that the different types of anticipation may work together and synthetically produce the system's general anticipatory patterns, or they may conflict and eventually cancel each other out. Very little is known about these processes, and I am forced to leave their analysis for another occasion.

6. A Bit of Ontology

The only ontological problem that I need to touch upon is that reality comprises not only what is actually given but also dispositions, habits, tendencies, and the forces generating them. Let us say that reality also includes latents. Even if these may not be actually detectable in any given situation, they may nevertheless be there. Latents may become actual, if proper triggering conditions are in place, or they may be lost in the process. The simplest case of latents is given by dispositions, which can be described under the label "what would happen if" (what would happen if sugar were added to a liquid). Occasionally, latents can be perceived even when they are not exercised. They form a kind of halo around persons and situations. Individual and group decisions can actually be based on the perception of latents. The lack of a general theory of latents, however, makes it difficult both to organize systematically the psychological data already available and to guide research towards a better understanding of the less known aspects of the perception of latents. Be that as it may, a major difference between the behavior of people and the behavior of institutions is that the latter seem remarkably less able to perceive latents.

7. Dynamic Patterns and Complexity

Systems – social systems included – are dynamic entities. During the past two centuries, dynamic theories have developed enormously. The question naturally arises as to whether the dynamic theories developed to understand nature can be used to understand society, or the mind.

For this reason, I, for one, welcome the research developed by Peter Coleman and his group in order to apply the framework of dynamic theory to social conflicts ((Coleman P. T., Conflict, Complexity, and Change: A Meta-Framework for Addressing Protracted, Intractable Conflicts -III, 2006) (Coleman, Vallacher, Nowak, & Bui-Wrzozinska, 2007)). In time, this and related efforts may result in more sophisticated theories of social conflicts. In this sense, the idea of exploiting the tools developed by the natural sciences is a necessary starting point, and more groups should follow up on Coleman's efforts.

Knowing whether or to what extent theories developed for physical problems can be used to model social phenomena will be a remarkable result. It will show how physical-based frameworks can be "tuned" so that they are more suitable for social-based applications.

For instance, dynamic system theory distinguishes among different types of attractors. It will be important to know which of the various attractors distinguished by mathematicians are suitable for the modeling of social phenomena. Perhaps new types of attractors are needed, ones different from those used to model physical problems. These questions alone may guide research for a number of years.

There are reasons, in fact, for believing that dynamic system theory needs further development if it is to be usable for modeling social phenomena. Within physics, dynamics are defined only with respect to wells of energy: only powerful actions are able to change the system. However, it seems that, at least in some cases, social behavior can be changed through powerless actions. St Francis, the Mahatma Gandhi, Mother Theresa, and the community of St Egidio are but a few examples of people and institutions defending the force of powerless actions.

How can it be possible for powerless actions to modify the dynamics of a system? Systemically speaking, this is something that makes no sense, at least for physical systems. If, however, social systems are not reducible to physical systems, there may be room for something else, possibly other types of energy – some kind of psychological or perhaps directly social energy – characterized by laws different from those governing physical energy. The above-mentioned latents may eventually provide insights in this regard.

8. Conclusion

Our understanding of anticipatory systems is still very partial, and this entails that the connection between anticipations and conflicts needs further research. For the time being, only some highly provisional conclusions can be drawn.

If it is true that anticipations essentially depend on hierarchical loops, no complete algorithmic model of anticipatory systems will ever be developed. What we may eventually be able to develop are sets of partial models addressing different aspects of a given anticipatory system.

While some of these models may represent observables and the procedures for dealing with them (e.g. conflict management procedures), other models should try to represent the system's latents. Since anticipations may be at work behind manifest behavior, we should find ways to map reality not as something entirely manifest but as a field of dispositions and powers, i.e. as a field of possibilities or latents.

The most general way to make latents visible is to change the system's boundaries. The simplest strategy is to embed the system within a larger context or system. In fact, most systems change their dynamic patterns when embedded within larger systems. Inducing new dynamical patterns via embeddings within larger systems is usually less difficult than trying to change the system's dynamics in a direct way.

When embedding into larger systems proves not to be a viable strategy, the opposite strategy of segmenting the original system into smaller systems can be tried.

For those cases in which none of the usual strategies work, one may try to induce (controlled) dynamic dissonances into the system. This is a potentially dangerous option, because it may definitively ruin the system. However, there may be cases in which the induction of dissonances is the only option available. The presence of internal dissonances forces the system to reconsider its dynamic identity and eventually change its guiding patterns, e.g. by reconfiguring what it considers to be good and bad.

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