WHY IT IS HEALTHY TO REGULARLY CHALLENGE AUTHORITY: AN ALGORITHMIC EXPLANATION

O. Kosheleva
Ph.D. (Phys.-Math.), Associate Professor, e-mail: olgak@utep.edu
V. Kreinovich
Ph.D. (Phys.-Math.), Professor, e-mail: vladik@utep.edu

University of Texas at El Paso, El Paso, TX 79968, USA

Abstract. One way to make group decisions is to select the best decision maker(s) in the group as the authority, and to follow his or her decisions. At first glance, it seems that if the selected authority is indeed the best decision maker, it is beneficial for everyone to obey his or her authority. However, history shows that in many cases, challenges to the authority (even to the authority of the best decision maker) were beneficial to the group. In this paper, we provide an algorithmic explanation for this phenomenon. The main idea behind this explanation is that most practical general problems are NP-hard and thus, no feasible algorithm can solve all instances of such a problem. Thus, even for the best decision maker, who uses the best of the currently available feasible algorithms, there inevitably are cases when the resulting decision is not the best, and can thus be improved.

Keywords: decision making, authority, NP-hard.

1. Formulation of the Problem: In Spite of Seemingly Reasonable Arguments to the Contrary, Evidence Shows That It Is Often Healthy to Challenge Authority

Need to make group decisions. In real life, we all need to make decisions. A decision made by one person often affects others, so it is necessary to coordinate our decision making, i.e., in other words, to make *joint* (group-wise) decisions. So, a group of people needs to make decisions — and act according to the selected decisions.

In general, everyone has his or her own interests, but suppose that the people in a group agreed — formally or informally — how to combine these interests into a single objective function. For example, they can use Nash's bargaining solution and try to maximize the product of their utilities; see, e.g., [1].

Authority as a way of making group decisions. One way of making a group decisions is to delegate decision making to a person (or persons) who are most skilled in decision making. This is the meaning of authority.

At first glance, it makes sense to obey a competent authority. If the person selected as an authority is not competent, if his or her decisions are clearly not optimal, then it makes no sense to obey this authority — and, moreover, this authority has to be replaced.

But if the selected authority is indeed the best decision maker in the group, it seems reasonable to listen to his or her advice and follow this advice.

In practice, it is often helpful to challenge authority. In spite of the above seemingly reasonable argument, history shows that in many real-life situations, challenging authority, disobeying authority was the right thing — which turned out to be beneficial for everyone.

In some cases, it was simply the case when a new person appears who is a better decision maker than the previous authority — this is a clear case when the previous authority needs to be challenged. However, often, even when the decision maker remains the best one, some cases when his or her authority are challenged benefit everyone. Why?

What we do in this paper. In this paper, we provide a natural explanation for the above empirical phenomena: namely, we show that from the algorithmic viewpoint, it is indeed healthy to regularly challenge authority.

2.   Algorithmic Explanation

Many real-life problems are NP-hard. In most real-life problems, the objective is clear, and it is practically possible (feasible) to check whether a given proposal indeed satisfies the desired objectives.

In computer science, *feasible* algorithms are usually formalized as algorithms A that require polynomial-time, i.e., whose running time $t_A(x)$ on every input x is bounded by a polynomial $P(\text{len}(x))$ of the length of the input: $t_A(x) \leqslant P(\text{len}(x))$; see, e.g., [2].

Problems for which, once we have a proposal, we can feasibly check whether the proposal is indeed a solution, are known as problems from the class NP. This abbreviation stands for Non-deterministic Polynomial, meaning that once we have *guessed* a solution (this is what non-deterministic means), we can check, in polynomial time, that this proposal is indeed a solution.

Many practical problems from the class NP are *NP-hard* meaning that they are the toughest among all NP-problem. This implies that unless the class NP *coincides* with the class P of all the general problems that can be solved by a feasible algorithm (which most computer scientists believe to be impossible), no feasible algorithm is possible for solving all particular cases of this general problem [2].

Resulting explanation. Since no feasible algorithm is possible for solving a general problem, this means that a feasible algorithm (explicit or implicit) used by the best decision maker (i.e., by the authority) does not always solve the specific instance of this problem. Such cases are inevitable, and inevitably, they appear on a regular basis — indeed, if there were only finitely many such cases, we would be

able to add the solutions to these cases to the original feasible algorithm and get a new (still feasible) algorithm that would solve all the instances.

Thus, regularly, there appear situations in which a better decision is possible than the one provided by the authority — and thus, it is indeed healthy to challenge authority.

Of course, the authority has to be responsive. The goal of a beneficial challenge to authority is to make decisions which are better for the group. The only way to achieve that is to make sure that the authority encourages such challenges — instead of requiring blind obedience.

3. Theological Speculations

Why many religions teach obedience to God. As we have mentioned earlier, intuitively, it seems like obeying the authority makes perfect sense — at least the authority that is clearly able to make better decisions. The only argument against obedience come from the discussions related to NP-hardness, and this notion is reasonable new, it only appeared in the early 1970s. It is therefore not surprising that many religions, in line with our intuition, encourage obedience to God — as a very good decision maker.

Our arguments also explain why some religious texts seem to also encourage us to challenge authority. On the other hand, while the formal notion of NP-hardness is recent, the corresponding intuitive idea — that no general method is possible for solving all the problems — has been explicitly voiced many times in the past. It is therefore not surprising that some religious texts also encourage us to challenge authority.

For example, many Biblical texts can be thus interpreted, the most well-known one is when Abraham argues with God about the fate of Sodom — and succeeds in decreasing the threshold number of non-sinners that would guarantee that the city will not be destroyed. The impression we get from this passage is that God is appreciative of such challenges.

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