

# Manipulating Persuasion in Debates: Fact Checking's Usefulness

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## Abstract

Persuasion can be considered as a situation where subjects having an opinion or an argument are willing to change it in favor of others' proposal only if the new message has personal relevance and significant consequences on their lives. In this paper, we argue that improvements in the information set and the knowledge of the fundamental rules of a "well-formed formula" are necessary to minimize errors when people make their choices. Arguments can be manipulated either in terms of the truth of premises or in terms of the logical connectives among propositions. The emerging mechanism of the so-called fact-checking, used to verify candidates' statements during the electoral campaign, may be a very useful instrument to realize these improvements in political debates.

## Keywords

Persuasion, Logical Connectives, Political Debates

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## 1. Introduction

Persuasion is as a social act where the persuader conditions the others' opinions so that they believe that the pursuit of the new proposed objective is necessary to achieve their goals, see [1]. In debates participants can often incur in incorrect arguments or fallacies. It happens especially when each discussant desires to win in order to take over the others, as it happens in the political ones. Such a behavior can cause damages to the opponent in the discussion and the argumentation, even if it is a deliberate pursuit or not.

We focus our attention on the effects of public statements directed to a broad audience of subjects/voters having a common objective about a particular policy.

Recently, various strands of literature interested in persuasion have been developed (see [2] for an excellent

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review). They yield a selective survey of empirical evidence on the effects and the drivers of persuasive communication in several fields involving consumers, voters, donors and investors.

From a more theoretical perspective, in [3] it is developed an economic theory of persuasion in collective decision-making, both in the fields of smoking and in politics.

Furthermore, an analysis on the mechanism used to persuade a listener to accept a particular request can be found in [4]. Their aim is to find those mechanisms that maximize the probability that the audience accepts the request when it is justified and rejected the request when it is unjustified. In [5] there is an extension of the analysis of a dynamic environment. Moreover, it is depicted a single linear program to find the optimal rule in a context that involves back-and-forth communication.

In their work, [6] sheds light on uninformative advertising and product branding, and in mutual funds behavior. [7] study persuasion affects experimentally through an ultimatum game. Among the authors focusing specifically on persuasion in politics, [8] presents a model for the creation of social networks, including political parties, trade unions, religious coalitions and political action committees. [9] considers a democratic society where the voters have imperfect information on how the economy works: the parties may have then a strategic motivation to misinform the voters. According to [10], citizens can make rational choices between candidates: they use information shortcuts they received and with a small amount of personal information to construct a narrative about candidates. The author verifies his theory by analyzing several political competitions in US from 1976 up to 1992. Similarly in [11], voters are considered as rational types, while candidates rationally distort their actual policy position. With a different opinion, [12] discusses the pessimism on the voters' rationality.

In this paper, we analyze persuasion as a situation where subjects who have an opinion or an argument are willing to change it in favor of others' arguments. We assume they do so only if they expect that this decision will have a positive impact on their lives or will improve the desired state of the world with respect to a well defined objective<sup>1</sup>.

Nevertheless, subjects can be persuaded to change their opinions in a wrong manner. This happens when they have mistaken beliefs due to weak information on the truth of premises and not enough knowledge about the correct structure of logical connectives. In fact, people are not able to perceive the unreasonableness of an argument without the theoretical tools of the analysts. Real propositions should follow logical structures consistent and correct in order to deduce what are the most probable outcomes. Consequently to prevent manipulation it is not only necessary to increase the set of information, but also to make more the explicit rules in debates, where manipulators can't use illogical connectives and display information gaps.

Starting from the result of [4] we devised a model to show how to avoid manipulation in debates. We build a persuasion process to show how the so-called "well-formed formula" represents an optimal rule to avoid manipulation in debates. The paper has the following structure: in Section 2 the logical structure of arguments and manipulation are described, in Section 3 we discuss the emerging use of the mechanism of the so-called fact-checking to detect manipulations in political debates and Section 4 contains the conclusions.

## 2. Manipulating Proposals and Logical Structure

### 2.1. Setup

In our model, premises are considered as specific inputs to reach a conclusion. From these premises we initiate to deduce conclusions by inference. Conclusions are correct if the pattern of reasoning follows a so-called "well-formed formula" (from now on "wff"). In the same way as languages have grammar rules a statement must meet to make sense, similarly a wff must meet a general rule. It requires that every conjunction has to link two statements in an unambiguous manner.

In essence, inference is based on these assumptions and they correctly define the outcome if they are logically constructed. Therefore the wff requires that the premises shall be formulated as real and correct; namely they have to be feasible and well defined. The wff implies the knowledge of a function leading from the premise  $x$  to the conclusion  $y$ . In other words, we have to be sure that this feature is true: this is the so-called "table of truth". In practice, the "table of truth" is the logical-mathematical consecutio according to which reasoning develops.

In this work, the term wff is used for those formulas characterized by the following logical structure:

- i) to give an unambiguous and complete definition of the domain of the feasible proposals;
- ii) to make a clear interpretation and explanation of the connective logical principles used to make inference

<sup>1</sup>For more theories on Persuasions see the cited references in Petty, 2013.

from the proposition to the outcome which can't be contradicted according to the mathematical logics (for a full description and list of these connective logical rules see for instance [13] [14]).

Correct inference makes it possible to verify whether a particular outcome follows from a particular premise. A proposal is right according to all the possible interpretations derived from the assumption. Hence, we require both that the assumption defines its domain and a table of truth on the logical connectives from the proposal to the outcome.

In this work, we analyze how, in this set up, arguments are not easy to manipulate, neither through a wrong or incomplete definition of the propositional variables nor by using illogical connectives. In fact, when a “well-formed formula” is in use people can see that the arguments offered are not feasible in terms of the table of truth.

## 2.2. It Is Possible to Prevent Manipulation

In this framework, following [4], it is assumed that there are only two subjects, the listener  $i$  and the speaker  $j$ . The subject  $i$ , who represents the median voter, has an argument representing his preferences or the desired result about a certain policy and therefore he defines a preferred policy  $x \in X$  to get the preferred outcome  $y \in Y$ . The policy  $x$  presents several features which are relevant for  $i$ , i.e.  $x = (x_1, \dots, x_n)$ , where  $x_k \in X_k$ , is the realization of a random variable  $A_k$  called *aspect*,  $k = 1, \dots, n$  and  $X = \times_{k=1}^n X_k$ . Most of the analysis will be conducted for  $k = 1, 2$ .

A problem is  $(A, X, p, Y)$ , where  $A$  is a non empty set such that  $A \subset X$ ,  $Y$  is the set of the outcomes and  $p$  is a probability measure on  $X$ . We denote by  $p_x$  the probability for policy  $x$ , i.e.  $p_x = p(\{x\})$ . We can identify the speaker type with the policy  $x$  he promises.

For instance with respect to a possible policy  $x$  about jobs, the voter  $i$  prefers the policy which must have at least two aspects concerning wages and workhours. The voter  $i$  will choose the proposal  $x$  which ensures both the aspects but also a given unemployment rate without lowering wages or with too high workhours. As another example the candidate may propose to realize a project which ensures a profit  $y$  given its aspects related to the amount of costs and revenues. The rational voter will accept the proposal which ensures a threshold for the profit, knowing that revenues and costs may assume specific values in a given set.

Therefore a function  $\phi: D \subset X \rightarrow Y$  is defined and if the listener is aware of this function he can immediately verify if the proposed policy leads to  $y$  according with the constraints  $x \in X$  and  $\phi(x) = y$  and make his decision accordingly.

The other subject named  $j$ , the speaker, who represents the candidate in public election, sends his proposal to the subject  $i$ . The proposal can be fair or manipulating and represents a promise to reach better results so that  $i$  is willing to accept it only after a valuation of his updated argument-expectations. The subject  $j$  wishes to persuade  $i$  to accept his proposal, while  $i$  can either accept or reject that suggestion; that is, there is no partial acceptance. Therefore  $i$  has to take one of two actions:  $a$  (accept) or  $r$  (reject). He is interested in taking the action  $a$  if the candidate's type, who is identified with his policy proposal  $x^2$ , is in  $A$  and the action  $r$  if the policy  $x$  is in  $R = X - A$ .

Our objective in this Section is to analyse if using this *persuasion process*, a subject can be persuaded to accept a manipulating proposal when we introduce additional constraints to define the region of acceptance  $A^* \subset A$  based on the wff rule.

Therefore we consider an agent who attempts to reason about the possible desired result of a specific policy and who decides to accept a proposal taking into consideration not only the aspects, but also by checking the wff rule which is defined as follows:

- i) the feasibility i.e.  $x \in X^* \subset X$  which contains all the aspects which are true and which must be defined in an unambiguous and complete manner;
- ii) the outcome  $y \in Y$  is represented by a known function  $\phi: D \subset X \rightarrow Y$  where the listener can immediately verify if the proposed policy  $x$  leads to  $y$ .

According to these assumptions, while an individual without analytical skills makes his decisions evaluating only the message about the aspects, on the contrary an individual endowed with analytical supports evaluates

<sup>2</sup>We want to stress that a voter in order to be rational and to avoid manipulation should put attention on the possible outcome which may be realized through a given proposal more than on shortcuts on the candidate himself, this is why we identify the candidate with his proposal.

also the persuasion function under the constraints i) and ii). Consequently some proposals could be rejected *ex ante* or assigned a lower value as illogical and totally inconsistent because they do not respect these constraints.

It is possible to show that the wff represents an optimal persuasion rule, that is a rule that minimizes the probability of manipulation in decision making problems. The acceptance region  $A$ , is now substituted by  $A^*$  which takes into consideration also the wff constraints, *i.e.*  $A^* = A \cap X^* \cap D$  and  $R$  is now replaced by  $R^* = X - A^*$ .

As in [4], some additional settings must be specified in the previous model. Therefore, we consider a direct mechanism  $(M, f)$ , with  $M = X$ , where  $M$  is a set (of messages) and  $f : M \rightarrow Q$  where  $Q$  is the set of all lotteries  $f = \langle \pi_0, d_0; \pi_1, d_1; \dots; \pi_n, d_n \rangle$  where  $\pi_k, k = 1, \dots, n$ , measures the probability that the aspect  $A_k$  is checked by the subject  $i$  and the action  $d_k(x_k)$  is taken, with  $d_k : X_k \rightarrow \{a, r\}$ . If with probability  $\pi_0$  no aspect is checked the action measured from the constant  $d_0 \in \{a, r\}$  is taken. In other words, the set  $Q$  captures the assumptions that the voter  $i$  can check at most one aspect  $A_k$  and that the aspect to be checked can be selected randomly with probability  $\pi_k$ .

For a direct mechanism  $(X, f)$  we say that following a message  $m$  the mechanism verifies the aspect  $A_k$  with probability  $\pi_k$  when  $f(m) = \langle \pi_0, d_0; \pi_1, d_1; \dots; \pi_n, d_n \rangle$  is such that  $d_k(x_k = a)$  iff  $x_k = m_k$ .

The subject  $j$  will choose a message that maximizes the probability that the action  $a$  is taken, namely he chooses a message  $m \in M$  which maximizes  $(m, f(m))$ . We define the probability of errors for subject  $i$  choosing proposal  $x$  denoted by  $\mu_x^*$ , where:

$$\mu_x^* = \begin{cases} 1 - \max_{m \in M} f(m)(x) & \text{if } m = a \in A^* \\ \max_{m \in M} f(m)(x) & \text{if } m \in R^* \end{cases}$$

This *persuasion problem* is modeled as a fourth-tuple  $\langle A^*, p, X, Y \rangle$ , where  $A^* \subseteq X$  consists of the proposals  $x$  that  $i$  is willing to accept as he expects that the message  $m$  satisfies the aspects but also the wff constraints. In this framework, we are now ready to show that

**Proposition 1.** *Let  $(A, X, p, Y)$  be a problem and suppose the acceptance region  $A^*$  satisfies the wff rule and  $A^* \equiv X^* \cap D$ , then*

$$\mu_x^* = \max_{m \in M} f(m)(x) = 0 \quad \text{if } m \in R^*.$$

Using wff, if  $m \in X - X^* \cap D$ , then proposal  $x$  is immediatly rejected since  $X^* \cap D \subset A$ .

**Remark 2.** *The above result can be interpreted in two ways. First of all, if the speaker is not aware the listener is using wff, then he tries to manipulate but his proposal will be rejected. On the other hand, if the speaker is aware the listener is using wff, then he does not even try to send a message to manipulete since he knows that the probability the listener will accept his proposal is null.*

If we remove assumption  $A^* \equiv X^* \cap D$ , so that  $X^* \cap D - A \cap X^* \cap D$  is not empty, and we compare our result with Glazer and Rubinstein (2004) where they introduce  $\mu_x$ , as:

$$\mu_x = \begin{cases} 1 - \max_{m \in M} f(m)(x) & \text{if } m = a \in A \\ \max_{m \in M} f(m)(x) & \text{if } m \in R. \end{cases}$$

we derive  $\mu_x^* \leq \mu_x$ ; in other words, the error the listener can make is smaller if he can apply wff because the region where the speaker can manipulate is restricted by the constraints of the wff.

Therefore we find two main results:

1. *It is not possible to accept a proposal when  $m = r$ .* We have the same decision-making process as in [4], but our listener decides under the constraints of the “wff rule”. Then we have a constrained problem and the speaker too has to deal with it. Therefore, within the “wff rule” manipulation is impossible, because the manipulative proposals are always rejected. In fact the speaker can try to manipulate the listener, but he is forced to act under the constraints of the “wff rule”;

2. *There are strong disincentives to manipulate.* If the speaker takes his decision being aware that the listner

takes on turn her decision in the set of acceptance  $A^*$  then there is a manipulator proposal  $m$  that maximizes her objective function  $f(m)(x)$ .

### 3. The Fact Checking: wff Rule in Political Debates

A useful tool, since a long time used in US but now rapidly emerging all over the world, to evaluate the statements of the protagonists of the electoral challenges is the mechanism of the so-called fact-checking. It is devoted to the scrutiny, almost in real time, of the claims of political, judicial and economic data, at national and international level, and of the relationship of causality between these data, through objective judgments made in three encodings: true, partially true, not true. This instrument of great success has gained support and interest from the public to the analysis of the speeches of politicians and it is substantially based on the wff rules. This mechanism does not enter into the merits of political programs, but it makes a real-time verification of the data referred by the protagonists of the campaign. The public of voters appreciates the clarity that this provides in assessing the quality and feasibility of the proposed policies, before making a decision about the preferred candidate/political program.

The fact checking, if accurately realized, can also be a good incentive to the care of the content of political debate by the audience and the candidates themselves, prior to the election, to give the right information, which is crucial for the functioning of a democratic system. The benefits act in both directions: the political class puts more attention on formulating programs and promises and the electorate gets used to obtain accurate data and to request them.

This is an osmotic process: it improves the quality of the debate increasing the visibility and responsibility of candidates and thanks to the increased awareness of public opinion. Anyway this is not sufficient to change the type of information produced during the election campaign or to redeem the conscience of the candidates. Politicians continue to tell some lies and the voters to vote according to their personal attitudes, nevertheless it is still an incentive to give dignity to the political debate. In fact, thanks to this mechanism, because the candidates know that there is someone who dissects their claims, they are less likely to make manipulating illogical or not true proposals, so that they put more attention on what they say. For instance, results from the fact checking realized at the Italian University of Tor Vergata in Rome, on the assertion of Italian political debates in relation to the two elections of the first candidate in the Democratic Party and of the Prime Minister in the year 2013, showed that all the candidates interviewed at the national election have been quite truthful, probably because they knew the fact checking was at work during the public debate on television ([http://www.economia.uniroma2.it/comunicazione/rassegna\\_stamp/default.asp?page=9](http://www.economia.uniroma2.it/comunicazione/rassegna_stamp/default.asp?page=9)).

A possible limitation of this mechanism is that the promises made by the candidates will be analyzed as soon as they are made only to check if the premises are realistic and if they can be realized within the predetermined time. Much less attention is devoted to the analysis aimed to reveal the limits of those projects or statements as too ambitious or totally inconsistent in terms of feasible consequences.

In our model this is equivalent to pay more attention to the truthfulness of the domain of  $\phi$  and not to the validity of the logical connections from which to derive important information about the actual feasibility of the promises. Maybe this is one of the reasons why the fact checking is not sufficient to expose the falsehoods of politicians, so that there may be someone who wins the elections thanks to his fascinating promises that touch the most immediate needs of the voters. Therefore, to raise the quality of elections and political debates there should be an increase in the quality both of the demanded and of the offered information, or in other words both the information set and the knowledge of the logical connectives rules available to the voters should be strongly improved, according to the right structure of the “well-formed formulas”.

### 4. Conclusions

Our analysis shows that it is possible to prevent manipulation in two ways. The first, when the voters' choice is related to the connection between the aspects of the proposal and the results that the listener wishes to obtain. Secondly, manipulation may happen when the evaluation of some aspects is made according to some simple rules of logic aimed to certify their validity.

For instance when the speaker asserts that a relationship between two events, real or perceived, is of causality, he often tends to present two things as if they happen simultaneously or sequentially. But their relationship may just be a coincidence or may be caused by a third event. Another example is the well-known case of the so

called populism used to validate a thesis saying that it is very popular. Sociologists, political analysts and philosophers have long debated on the real possibility for citizens to exercise what [15] is called parrhesia, namely the virtue of political rulers to exercise their power through the act of meaning-the-truth, as well as the capacity of citizens to demand accountability from the rulers. [16] talks about a managed democracy, a system where the continuous use of persuasion techniques prevents the electorate influence on the policies that the state puts in place.

In this paper we argue that the role of an intermediary between proponents and voters is helpful, as individuals do not always have the ability of analytical assessment, the possibility or the availability of information. An example is the typical cases of incomplete information and informative asymmetry.

In this light, as well as from the results of our work, the role of the intermediary becomes more important than ever. Undeniably, it acts as a center for the collection and analysis of all relevant information, which is useful to the voters for the elaboration of an informed and conscious choice. In political debates, this role is played by the companies doing fact checking. Thus, they can be seen as a kind of rational consciousness of the “predictably irrational” voter [12].

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