

# The science of rumors

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“Every rumor has its audience”  
Gordon Allport e Leo Postman  
*The Psychology of Rumor*

## ABSTRACT

*This study takes a soft scientific cut to talks about rumors, hoaxes and urban legends. Social psychology, more elegantly, uses the latin word rumor (rumour in British English), which means sound, voice, or gossip. In social, economical, political, cultural and scientific communication, rumors indicate news that is presumed true, that circulates without being confirmed or made evident. The scientific history of rumors is briefly described starting from the period of ancient Rome, throughout the Second World War and the Internet era, up to today. We will try to answer some questions that can be useful to scientists today. What are rumors? How are they born? How do they spread? By which laws are they regulated? How do we need to fight them? A final question regards the collocation of rumors into modern science. Science today is divided into ‘hard’ and ‘soft’ science (the latter of which generally lacks a basic mathematical structure); these terms, respectively, indicate the natural sciences, which investigate Nature, and the social/human sciences, which investigate man in all his facets. Maybe rumors can be thought of as a bridge suspended between two banks: those of ‘scientific truth’ and ‘human truth’.*

## 1. Introduction



The history of rumors is as old as human history. Even in remote antiquity, rumors, gossip, and hoax were always in circulation – in good or bad faith – to influence human affairs. The ancient Romans had a god devoted to rumors: the goddess Fame.<sup>1</sup> This goddess was represented as a woman always in motion, constantly shouting and spreading good and bad news. Young and impetuous, she was often pictured with wings covered with eyes, mouths and tongues, in the act of

playing a trumpet or two, one for truth, the other for lies. This winged monster allegorically represented rumors that arise, spread, gain credibility, do not distinguish between truth and falsity, and amplify and distort the facts at will.<sup>2</sup>

Let us now give an example of what a rumor is and what effects it can produce. On October 30, 1938, the radio drama *The War of the Worlds* was broadcast from the Columbia Broadcasting System (CBS) studios in the U.S.A., starring by Orson Welles and based on the science fiction novel by Herbert George Wells.<sup>3</sup> This program became famous, as it triggered panic by describing an alien invasion. Despite notices sent out before and after the program, many radio listeners did not realizing that it was fiction, and they believed that the landing of hostile aliens in U.S.A. territory was really happening. Indeed, the adaptation of the novel simulated a special newscast that was at times inserted above the rest of the scheduled radio programs to provide updates on the landing of the bellicose Martian spacecraft in the town of Grovers Mill, New Jersey. With these words, Orson Welles described the uproar that his interpretation had caused: “The size of the reaction was incredible. Six minutes after we aired, the houses were emptied and the churches were filled, from Nashville to Minneapolis people raised cry and tore their clothes on the street. We began to realize, while we were destroying New Jersey, we had underestimated the extent of the vein of madness of our America”.

Today with the development of mass media, the rise of the internet and social networks, rumors are ubiquitous. “Did we really ever go to the moon?”. Higgs boson: “What has God got to do with it?”. “Harold Camping’s prophecy about the end of the world today, October 21, 2011, did not come true. Now we have to wait until December 21, 2012, to see if the prophecy of the Maya will come true”.

Then to the rumors and prophecies that relate more closely to the earth sciences and seismology: “On May 11, 2011, there will be a devastating earthquake in Rome. The prediction of Raffaele Bendandi...”.

## 2. Epistemological digression

Talking about rumors puts us ahead of some philosophical questions regarding epistemology. Epistemology is derived from *epistēmē* (certain knowledge, science) and *logos* (discourse). In a narrower sense, epistemology is identified with the philosophy of science, which deals with the fundamentals of the various scientific disciplines. In ancient philosophy, the term *dōxa* (opinion) was used to indicate an uncertain knowledge. Plato, in the fifth book of the *Republic*, reports the words of Socrates: “Science and opinion are not tangible things, but forms of *dy-namis*, that is, faculty or potential”.

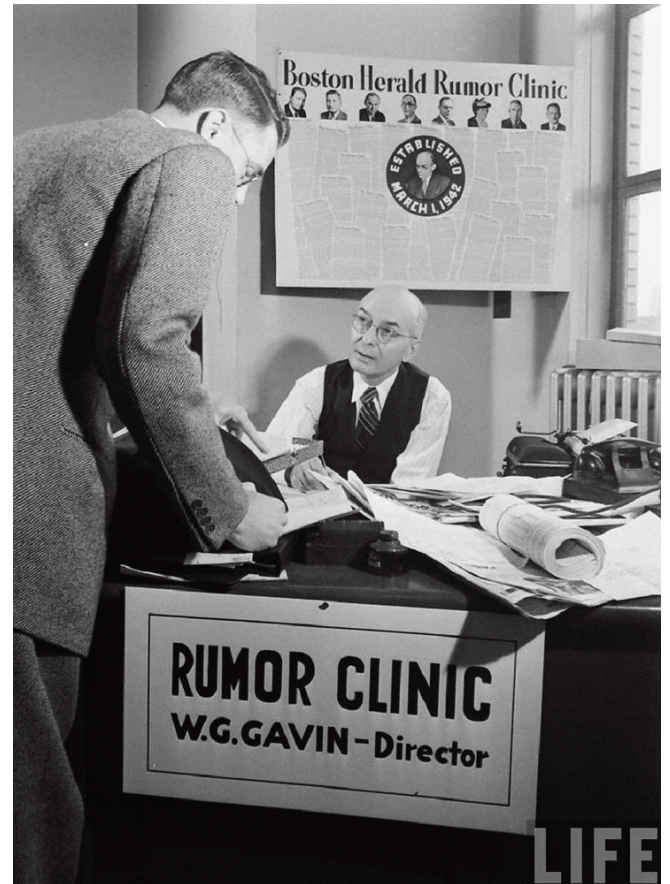
The problem, therefore, is a problem of demarcation between what is science and what is not, or the difficulty to distinguish science from pseudo-science and religion. If we try to exemplify these brief epistemological notes, we are faced with some questions. Is truth closer to science or to what people believe? How can we approach scientific truth? Can scientific truth be established by the scientific community on the basis of a majority? And then, how should minorities and voices of dissent be considered?<sup>4</sup> While rumors express common opinion (*doxa*), what should science do to combat against rumors?

## 3. Scientific studies on rumors

In 1940, in America, rumors about World War II began to spread. The U.S. government was worried about these rumors, as there was a risk that they would affect the social unit of the United States before they entered the war (the U.S.A. entered World War II on December 8, 1941). To fight rumors that were deemed dangerous to civil morality and national security, the U.S. government decided to set up institutional committees; at the same time, social scientists began to study the phenomenon of rumors.

Rumor Clinics were born in America (in Chicago, in 1942) as operating units of a larger project, known as the Rumor Project, that involved several government agencies and American universities. Using data collected by the Boston Clinics (1941-1942), every Sunday, the Boston Herald published the most famous rumors of the week, where the newspaper dedicated a column of the first page to dismantling the rumors according to the evidence from the facts.

After their studies on rumors during the second war, in 1947, Allport and Postman publish *The Psychology of Rumor*. This study is considered by many as a milestone of social psychology, because this science came from the universities to become a science that deals with reality. Allport and Postman [1947] defined rumors as propositions of faith on specific (or current) topics that pass from person to person, usually by word of mouth, without any evidence of their truth. Although rumors are usually communicated from person to person by word of mouth,



the media have a key role in their spread.<sup>5</sup>

For Allport and Postman [1947] the basic characteristics of rumors are:

- they are transmitted by word of mouth;
- they provide information about people, events and conditions;
- they express and meet the emotional needs of the community.

A crucial aspect in the definition of rumors is the emphasis given to their characteristics:

- disclosure (word of mouth, which is amplified by newspapers and media);
- content (news that is in the public domain, to be distinguished from private and trivial matters);
- listening (rumor spreads to the community because it responds to the emotional needs).

According to psychoanalysis, Allport and Postman [1947] supported the idea that a rumor can respond to a state of uncertainty through the production of a response, and that this can have a cathartic effect.<sup>6</sup>

Robert Knapp, a student of Allport, collected and categorized rumors, and divided them in three categories based on their content:

- rumors of impossible dreams (‘pipe-dream rumors’), which reflect public wishes and expected results;
- ghost rumors and rumors based on fear (‘bogeyman or fear rumors’), which reflected popular fears and anxieties;

– rumors that lead to disagreement (‘wedge-driving rumors’), which are intended to undermine alliances and relationships.

Knapp concluded that negative rumors expand more easily than positive rumors. Jung [1959] proposed a classification of rumors based primarily on their temporal duration. He distinguished the rumors as ‘ordinary’ and ‘visionary’. For Jung [1959], visionary rumors have a universal symbolic value and they live a long time. This kind of rumor that expresses chronic anxiety is detectable in the archetypal images and the collective fears about the situation of the world, or in the universal desire for a supernatural power to redeem.

Other authors, such as Festinger [1957] and Prasad [1935], argued instead that anxiety and fear are supported and supplied by rumors (e.g. an earthquake in India in 1934). In this interpretation, the function of rumors is precautionary and to alert against disaster, and they also have an adaptive function in relation to catastrophic events.

In 2004, Prashant Bordia and Nicholas Di Fonzo published an article entitled *Problem solving in social interactions on the internet: rumor as social cognition*, where they stated that transmission of rumors is probably indicative of a “collective process of interpretation” (sense making). They reported also that in this process of collective problem solving, every rumor followed four stages of development:

- introduction of the rumor;
- spontaneous generation of opinions, from where discussions are created;
- resolution of the problem;
- loss of interest.

In their book *Psychology of Rumor*, Allport and Postman [1947] also formulated the basic law of rumor, in which the strength of the rumor ( $R$ ) is linked to the importance ( $i$ ) and to the degree of ambiguity ( $a$ ) of the topic, such that:

$$R \approx i \times a \quad (1)$$

Finally, according to recent studies, rumor strength is now considered a complex function of anxiety and uncertainty that can occur from internal states of individuals (trait anxiety) or from the outside, as state anxiety, or from their interactions.

#### 4. How to fight rumors

Fighting rumors is not a simple task. Generally there are only a few simple pieces of advice that can be issued to general public, such as:

- Don’t believe information coming from traditional media and new media;
- Check the sources from where the news came
- Do not consider any source as *a-priori* authoritative;
- Increase your own basic scientific knowledge;

– Always maintain a genuine scepticism and develop critical thinking.

To face up to rumors, a number of tools have been proposed that cover two areas: legislative and communicative-educational. In Italy, from a legislative point of view, reference is made to Article 21 of the Constitution, which protects the freedom of the press and free expression of thought, through any medium of communication. As an European Union Member State, Italy is obliged to respect the freedom of the press, as enshrined in the Charter of Fundamental Rights of the European Union (Art. II-71).

Recently, in many countries, controversy has been stirred up by some legislative measures that have been enacted to defend users from information inaccuracy. A specific type of these interventions provides what is called a ‘chilling effect’: some rules that make it possible to ‘freeze’ or delete a range of information that is deemed to be incorrect or inaccurate. In Italy, for example, much controversy has been aroused by the introduction of the Communications Authority<sup>7</sup> (AGCOM) Resolution No. 668/2010 which provides for an ‘erase system’ for websites suspected of violating copyright rules. Further legislative examples concern false alarms. In Italy, as in other countries, this offence is punishable by a fine.<sup>8</sup> A false alarm is considered as an act that triggers emergency procedures without there being the presence of a real danger, from cases of small importance, to events of greater social impact.

In terms of seismic risk and announced earthquakes, it is worth mentioning the case of Garfagnana (Tuscany, Italy). In 1985, based on predictions made by the Italian scientific community, Giuseppe Zamberletti, Head of the Italian Civil Protection, evacuated about 100,000 residents in an area where an occurrence of an earthquake was said to be possible. The predicted earthquake did not happen, and Giuseppe Zamberletti came under inquiry for procured alarm. In opposition to the case of Garfagnana, we can consider the events in relation to the earthquake in L’Aquila (Abruzzo, Italy) on April 6, 2009. Based on the analysis of the concentrations of radon gas in the area, Giampaolo Giuliani, a technician at the National Institute of Nuclear Physics, spread the news around about an earthquake that would occur on March 29, 2009, in Sulmona (a town situated about 80 km from L’Aquila). The earthquake at Sulmona did not occur, and Giampaolo Giuliani received a notification of procured alarm after the Head of Civil Protection, Guido Bertolaso, had requested for him to receive “exemplary punishment”.<sup>9</sup> A few days later, the devastating earthquake hit L’Aquila. Up to today, the trial remains in progress and the Department of Civil Protection will have to answer for its choices. The members of the Department of Civil Protection, Major Risks Committee are accused of multiple manslaughter and serious personal injury, as they provided reassuring messages to



the public six days before the earthquake occurred. Beyond the idea that the courts do not seem to be the most appropriate place to discuss problems of such relevant scientific and social impact, this theme of prediction *versus* unjustified alarm has generated vibrant scientific debate in Italy and abroad, which is still going on [see, for example, Hall 2011].

As regards the area of communication-education, the fight against rumors involves: communication, popularizing science and science education. Scientific communication is defined as the kind of information published by journals dedicated to the scientific community (a famous example is *Nature*), while using the expression of the 'popularizing of science' when what is meant is the spread of scientific knowledge to the general public. This is carried out in Italy by magazines such as *The Sciences*, television programs such as *Quark*, and internet sites like *MolecularLab*.

An article to be published in a scientific journal must pass a series of steps to assess its reliability, the validity of the research, and the expertise of the authors, among other aspects. So how can it be that prestigious scientific journals can publish errors such as the discovery of cold fusion.<sup>10</sup> For reasons still not entirely clear, Fleischmann and Pons held a press conference on March 23, 1989, before their research was to be published by a scientific journal. The publication was released on 10 April, 1989, as a short article written for the *Journal of Electroanalytical Chemistry* [Fleischmann et al. 1989]. The article, in the opinion of many scientists, was written in haste and was incomplete, and it contained some substantial errors in the measurements of the emission of gamma rays.

Therefore, it would seem that rumors cannot be effectively fought by the journals that deal specifically in the science, and this is also true for magazines, newspapers and the internet, which all contribute to the public understanding of science. Generally, in Italy, and it seems true for others European countries too,<sup>11</sup> journalists who deal with science do not have full scientific training, and this often leads to inaccurate scientific information that is offered to the public in a superficial and inappropriate way, and which is sometimes totally incorrect.

## 5. Conclusions

In our opinion, to combat rumors and to disseminate accurate scientific information, we should go in two directions: on the one hand, there must be the promotion of quality science journalism, by trained journalists in different fields; on the other hand, scientists must be trained to engage in communication and dissemination of scientific information.

A further consideration relates to science education. We note that the assumptions themselves of a science ed-

ucation are often misleading and incorrect. Science is often taught at schools as a dogmatic 'truth'. School programs do not provide epistemological training to develop observation, phenomenological approaches, and critical thinking. An example of a phenomenological scientific approach<sup>12</sup> has been developed by the EDURISK Project<sup>13</sup> (Istituto Nazionale di Geofisica e Vulcanologia; INGV, Italy) over 10 years of activity. It is an educational project to reduce seismic and volcanic risk in Italy, and it is proposed to Italian teachers as a multidisciplinary method, and with a strong phenomenological approach. The themes of seismic and volcanic risk can be explored through a variety of disciplines, ranging from history to literature, from religion to mathematics and engineering, and from psychology to natural sciences, geology and physics. This approach initially disorients teachers that expect truths and certainties by the INGV researchers. Instead, our approach proposes a path to knowledge that is built together, teachers, students and researchers.<sup>14</sup>

In conclusion we emphasize that the most effective response to combat rumors is to encourage a process of science education, ever more wider and open to the public, accepting the challenge of bringing reliability, accuracy and depth of science to the popularization of science.

In this direction, we are supported by the thoughts of Italian philosopher Giulio Giorello:

"We believe that scientific truth is nothing but a statement that somehow we can control and that can also be discarded and replaced by another, which allows us to better understand the experiences we have, the observations that are recorded. In this sense, what we care about is not so much the possession of something, but the tension, the effort we make. What I have checked, you can also check, because - as rightly said by Galileo, Descartes, Pascal, and all the great founders of modern science - any person who is able to understand and desire, and who will apply this, is able to make and control the experience. Science is public and verifiable by everyone. If it is controllable and public, it is also teachable".<sup>15</sup>

In our opinion, Giorello's words emphasize four main points that relate to science and how science is studied:

(1) the guarantee of scientific data objectivity, that to maintain such, it must always be clearly identified, separated from the processing and interpretation of what was done, so it can be taken and checked by other researchers, and therefore there is the importance of repeatability of scientific experience;

(2) the importance of calling into question acquired scientific truths, so that science really aims at arriving at the 'truth';

(3) the importance of knowing how to teach science, not as dogmatic truth, but as a cognitive process that starts from experience, observes a phenomenon, questions its

mechanisms, its meaning, and the relationships between its parts, and verifies that its learnings are useful to explain observed phenomena;

(4) the human dimension of science, both in an individual sense as science made by man and therefore fallacious and characterized by human experience, and as a collective process of knowledge that in order to be such must be of all.

#### Notes

1. Fame (derived from the Latin *fari*, which means to speak) was a deity as the allegorical personification of rumor in Roman mythology. Virgilio speaks of her personification created by the Earth after Ceo and Encelado. Literally translated, the Latin phrase *Fama volat* means that fame [the news] flies. (Virgilio, *Eneide*, III, 121).
2. Ovidio gives a broad description in the XII book of the *Metamorphoses*.
3. *The War of the Worlds*, published in London in 1898, is considered one of the first novels of science fiction.
4. Critics of the thoughts of Popper say that science would not have progressed without the minorities and 'dissidents'.
5. For example, the great cabbage hoax, [Hall 1965, 1977].
6. Allport and Postman [1947] refer to Freud's psychoanalytic model of emotions. This is a hydraulic model, emotions (internal) find a way (acceptable) to be expelled, and act on the internal tension.
7. The Communications Regulatory Authority is an independent authority, established by Law n. 249 of July 31, 1997. Independence and autonomy are elements that characterize its activities and deliberations.
8. According to Article 658 of the Penal Code.
9. On December 22, 2009, the court of Sulmona acquitted Giuliani of the accusation of procured alarm in connection with the March 29, 2009 events.
10. Cold fusion was suddenly in the spotlight on March 23, 1989, when chemists Martin Fleischmann of Southampton University in England, and Stanley Pons of the University of Utah in the USA, announced to the press that they had achieved it.
11. See, for example, Verhoeven 2010.
12. For a phenomenological perspective of the educational event, see for example Pezzella 2007.
13. The EDURISK project was proposed in 1999 at the National Group for Earthquakes Defense (GNDT) of CNR, merged in 2001 in the INGV. The project was conducted from 2002 to 2006 and then from 2008 to 2009. For more information see: *Sintesi dei lavori del Workshop EDURISK 2002-2011: 10 anni di progetti di educazione al rischio - Roma, 30 Novembre 2011*, edited by Vera Pessina and Romano Camassi, Miscellanea INGV, 13, 2012; available at: <http://istituto.ingv.it/1-ingv/produzione-scientifica/miscellanea-ingv/>.
14. For educational programs fulfilled in the project see the website: [www.edurisk.it](http://www.edurisk.it).
15. Il Grillo (11/12/1997): Giulio Giorello, La verità scientifica, In: *Enciclopedia Multimediale delle Scienze Filosofiche*, Rai Educational, <http://www.emsf.rai.it/grillo/archivio.asp>.

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