

Comparing Forms and Degrees of Critique: Ontologies of Vaccine Criticism

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Abstract

This paper presents an analytical tool: a coding scheme designed to evaluate the degree and type of divergence between a dominant orthodox discourse and the discourse of heterodox actors who criticize this dominant position. The author draws inspiration from Boltanski's (2011) conception of critique and analytical sociologists' decomposition of social reality to shed light on actors' ontology. By summarizing the differences between orthodox and heterodox accounts of reality in simple tables, this method makes it possible to compare the discourses of a wide variety of actors. To show the heuristic nature of this tool, the author uses it to analyse the controversy that emerged in France in 2009-2010 over the safety of the pandemic flu vaccine. The author presents the social and medical ontologies on which these various critiques were grounded and their varying degrees of radicalism.

Keywords: vaccination, qualitative methods, controversies, critique

Introduction

Today, with the Internet, rumours and conspiracy theories regarding technology and risk are the object of much public attention. With just a couple of clicks, anyone can find pamphlets detailing how the government spreads chemical trails in the air, microchips through the water and poison via vaccines. The most exotic ones get shared like funny jokes via social networks, mailing lists and conversations around the coffee machine. They are discussed in detail in media pieces to illustrate the purported contemporary crisis of trust in Science and pervasive lack of political literacy (Harambam and Aupers, 2015). Public authorities and manufacturers draw on them to delegitimize more legitimate forms of critique by equating them with these symbols of the irrationality of the

public. In an opposite move, anthropologists have underlined their crucial social significance. They have shown that rumours and conspiracy theories are both products of and responses to the fundamental tensions that exist in any given society, and in capitalist and globalized ones in particular (Atlani-Duault and Kendall, 2009; West and Sanders, 2003). Conspiracy theories constitute a specific political repertoire that enables people who lack social resources to voice their discontent with a social and economic system that leaves them politically powerless (Fassin, 2011; Harambam and Aupers, 2015; Atlani-Duault et al., 2015).

But, for researchers interested in socio-technical controversies, the categories of 'rumour' and 'conspiracy theory' are problematic in themselves.

We cannot help but notice that not all actors who produce discourse on genetically modified organisms, nuclear waste or vaccination comply with legitimate forms of political and scientific argumentation. This must be taken into account to understand their position in these controversies. At the same time, the question of when critique becomes labelled as a conspiracy theory or a rumour constitutes an object of empirical enquiry rather than of theoretical debate. These labels and labelling practices point to two crucial issues 1) Under what practical and symbolic conditions may discourses that deviate from a norm or an orthodox position emerge? 2) What are the practices that maintain some cultural repertoires at the margins of a given society?

This paper contributes to this research agenda in two ways.

Firstly, I propose an analytical tool which helps to evaluate, on a given subject, the degree and type of divergence between a dominant discourse and that of heterodox actors who criticize this orthodoxy. This tool can be described as a method for content analysis which consists in breaking down the natural and social ontologies in which these discourses are grounded. Ontologies constitute a point of entry into the way actors involved in sociotechnical controversies build their trajectory (for a review, see van Heur et al., 2013). Accurate analysis of these ontologies is a crucial step in the process of shedding light on such controversies. Social scientists have built a wide variety of typologies designed to analyse the multiple discourses dedicated to a given subject. However, most of them are specifically tailored for a circumscribed subject and very few can be adapted to other contentious subjects (for an exception, see Douglas and Wildavsky, 1983). Most researchers have to resort to building their own typology when they approach a new research object. The lack of such tools discourages attempts at systematic comparison. The coding scheme presented here helps to underline the degree of 'radicalism' of critiques addressed to a dominant discourse on a controversial subject. Also, by summarizing the different positions held by critical actors in simple tables, it facilitates comparisons of the discourses of a great variety of actors.

Applying this analytical tool to the subject of vaccine criticism constitutes the second contribution of this paper and a demonstration of the heuristic power of this coding scheme. I will focus on the controversy that emerged in France in 2009-2010 on the safety of the pandemic flu vaccination campaign. I will then analyse the discourse of the main actors who voiced their concern about the safety of this vaccine. I will present the social and medical ontologies on which these various critiques are grounded and the varying degrees of radicalism of these critiques.

This analytical tool is not without its limitations and challenges. I will develop on these issues in the conclusion but it is necessary to mention them at this stage to facilitate understanding of this case study. This tool's focus on discourses and their ontological foundations means setting aside crucial non-discursive forms of action in controversies. Discourses relying heavily on irony or rhetorical questions, favouring a polemical tone or implicit assumptions constitute serious challenges for the coder. More importantly, by comparing all positions to that of one orthodox actor or set of actors, the analyst runs the risk of approaching a controversy as the opposition between two camps (one being homogenous and the other, heterogeneous). These limitations are the price to pay for a clear statement of the ontological diversity in a given controversy. Some of these challenges can be resolved by developing several coding schemes or by combining this tool with other tools of controversy analysis.

Mapping forms and degrees of criticism

Boltanski's approach to critique

Luc Boltanski's approach to critique derives directly from his understanding of the power of institutions as partly symbolic. Institutions such as the State can exercise power on a large number of individuals and groups insofar as they are able to impose their own representation of reality (Boltanski, 2011). Because representations of the social, physical and supernatural world circumscribe the goals and expectations people set for their lives, political tensions necessarily revolve around the issue of correctly describing

the world. This approach has contributed to the understanding of conspiracy theories. In *Mysteries and Conspiracies* (Boltanski, 2014), Boltanski sets the not-so-new public fascination for conspiracies against the backdrop of the historical unification of power around the State. He argues that this unification has been built on the production of a relatively unified discourse on both the social and the physical world with Science and the Law being cornerstones of this process. However, gaps between this discourse and reality are inevitable. They stem both from the uncertainties that remain even when scientific knowledge exists and from the limits of the power of the State to uphold legality for all. Conspiracy theories are therefore a specific type of critique of the gap between official discourse and real life. They reveal the tensions underlying the relationship between the State and citizens.

Degrees of critique

The analytical tool I present here is grounded in Boltanski's (2011, 2014) definition of critique as the act of unveiling a gap between reality as presented by a dominant actor and reality as represented by the author of the critique. But I also take further inspiration from Boltanski's work. Indeed, while his description of the various forms of critique is very rich and cannot be summarized in a simple typology, this is precisely what I have done to build my analytical tool. The following is therefore a personal selection and interpretation of his tremendous oeuvre. Boltanski's work helps identify several degrees of radicalism of critique, which forms the first dimension of the tool presented¹.

Doubt. Firstly, one of the main themes in Boltanski's analysis of critique is the pervasiveness of uncertainty which gives actors a 'grip' to express their dissatisfaction. Underlining uncertainty in an opponent's claims to factuality is a form of critique. It is not exactly exposing the gap between what is said to be and what is, but it consists in suggesting the possibility of such a gap. This constitutes the first degree of radicalism in criticism.

Re-prioritizing. Secondly, Boltanski underlines the fact that in contentious events (controversies, trials, etc.) actors refer to a multiplicity of values to make their argument. Divergence often lies in the prioritizing of these different values. For instance,

one's decision can be based on the priority given to economic development over social justice and its critique can consist in explaining why the reverse should be favoured. Changing the hierarchy of values constitutes the second degree of radicalism. It belies a stronger divergence since this form of critique underlines an error in the understanding of reality. This does not only apply to references to overarching values such as equity, progress, charity, etc. In Boltanski's work, critique applies to all forms of descriptions or judgments on reality: factual statements, self-descriptions, moral values, etc. This 're-prioritizing' can be seen whenever an actor proposes a different evaluation of the importance of the statements on reality in their opponent's discourse.

Side-stepping. The third degree of radicalism consists in pointing out an important element that is not taken into consideration by the actor who is criticized. Contrary to the previous case, the critique does not only re-evaluate the importance of one or several aspects of reality as they are presented in the discourse of the criticized. She or he points to elements of reality which are not included. For instance, in a dispute over the care given to sick patients in a hospital, nurses can invoke the necessity to provide psychological support, while the administration and surgeons can deem this completely outside the realm of medicine and the hospital's mission. This testifies to a stronger difference in how these actors see the world since they not only disagree on the importance of selected aspects of reality on a given subject, but also on the selection itself.

Revealing the unknown. The fourth and final form of critique consists in a stronger form of side-stepping. The difference with the third step lies in the fact that the actor whose discourse is being criticized doesn't recognize (implicitly or explicitly) the element put forward by the critique as existing, as real. There is therefore a fundamental divergence on what constitutes the world rather than on the evaluation of the importance of elements of the world which are mutually recognized as real. An example of such a divergence would be when, at a trial for murder, the defender claims to have been commanded by a ghost to explain and excuse his or her actions while the

justice system does not recognize the existence of ghosts.

Types of critique

At this point, it is important to remember that the realms of science and of politics are never completely separated (Jasanoff and Kim, 2015). Because knowledge production is inseparable from the way it is used by actors to transform the world, most critical discourses articulate a critique of opponents' vision of the world, of their mode of producing knowledge, and of their legitimacy to take action in the name of the collective. Cultural differences among actors are therefore not only about how they describe the world outside them, but also how they view each other as commonly involved in transforming it.

A second dimension must therefore be added to our tool. In addition to evaluating the degree of divergence between actors, one must take into consideration the different aspects of this divergence. Do actors only disagree on how molecules interact? Or do they also disagree on the best way to improve human life by using molecular technology? In addition to a classification of degrees of radicalism of critique, we need the impossible: a typology of the aspects of reality that can be the objects of critique. Social scientists of all creeds have been fighting on this subject. One could argue that this is precisely the object of social sciences and that the constant evolution of the names of the various specialized forms of sociology, for instance (sociology of work, of culture, of inequalities, of gender, of beliefs, etc.) testifies to the impossibility to reach a common agreement on this issue. One could also argue that the heuristic power of such a hypothetical typology would depend upon the actors who are studied (some actors' vision of the social world might be closer to that of Pierre Bourdieu's than to that of James Coleman's for instance). Indeed, approaching actors' ontology of the social world with social science as a reference for comparison, one is immediately confronted with the fragmentation of research in the social sciences and the multiplicity of theories of what constitutes society.

However, fuelled by dissatisfaction with this fragmentation and the proliferation of social ontologies in academia, a group of sociologists

have proposed a simplified ontology of social reality. The project of Analytical Sociology consists in breaking down complex social phenomena into smaller parts and rebuilding them as mechanisms produced by the articulations of these social 'cogs and wheels' (Hedström, 2005; Hedström and Bearman, 2009). Analytical sociologists claim that by using their own classification of a limited set of fundamental social elements they can explain the emergence of any social phenomenon. Analytical sociology is a form of Methodological Individualism. Whether or not analytical sociologists are able to do what they claim is not my object of concern. I use analytical sociologists' intuitions very differently from them: as a method for thematic analysis rather than as a method for producing actual knowledge on the social world. This means that analysts can use this coding scheme without adhering to the claims put forward by analytical sociologists such as that the use of collective entities to explain social phenomena is un-scientific, that multi-agent modelling is the future of sociology, that individual rationality is the cornerstone of the social sciences or that ideology undermines current discourses on modernity. This coding tool is not an application of analytical sociology to sociotechnical controversies. It just recognizes the fact that analytical sociologists' decompositions of the social world are convenient ways of coding public discourses. The second dimension of our coding scheme is thus a simplified version of analytical sociology's ontology. Differences in ontologies can be approached by focusing on four elements that compose the description of social reality that is being contested: the actors involved, their beliefs, their intentions and the actions they undertake. This means that there are four main ways to criticize an actor's discourse and these ways are often combined:

Beliefs. One can criticize another's beliefs. This is typically the ideal form of intellectual debate. Arguments pertain to descriptions of the world independently of the actors who produce them. Discussions on whether the principle of Archimedes is true or false, or whether it is right or wrong to kill someone to save three others, fall into this category. Following Boltanski, critique

consists in showing the (more or less large) gap between the opponent’s belief and reality.

Actions. Most of the time, controversies arise because something has been done or is going to be done. Because many arenas where actions are taken are not very public, there is always the possibility that someone says he has done something when he has not. A second form of critique therefore consists in exposing a gap between the actions which are claimed to have been taken and the reality of these actions.

Intentions. A third form of critique pertains to the intentions of the actor whose discourse is the object of critique. Indeed, people often claim to only have the common good in mind when they are actually defending their own self-interest. A third form of critique therefore focuses on the motivations underlying the involvement of an actor in a given issue and showing a gap between their moral self-presentation and their actual morality.

Actors. Knowledge production and political action are collective enterprises which involve many different actors who have different roles in these processes. This division of labor in complex institutional settings is crucial in establishing trust and justifying a given action. However, there are often cases when a decision which is supposed to be taken by one actor actually reflects the influence of another. This is the case when public officials accept bribes to pass a law. A fourth form of critique consists in unveiling the gap between

the actors actually involved in a given action and the ones claiming these actions as their own.

While I drew inspiration from analytical sociology to invent this coding scheme, researchers using it should not restrict their analysis to the part of their actors’ discourses that corresponds to what analytical sociologists consider to be ‘proper’ sociological concepts. For instance, Actors do not have to be individuals in the discourses under scrutiny. A person can be criticized for being the puppet of larger collectives, ghosts, or of obscure forces. Analysts should be neutral regarding what the people whose discourse they analyse consider to be relevant actors. This coding scheme therefore also applies to non-analytical lay sociologies.

By intersecting the two dimensions outlined, the critique a given actor addresses to another one can be summarized in a simple table with 16 forms of critique:

The lowest four slots constitute the most radical forms of criticism with slot 13 corresponding to very esoteric descriptions of the physical world and slots 14, 15 and 16 corresponding to very esoteric descriptions of the social world. Before applying this analytical tool to the subject of vaccine criticism, it is important to remember that these categories are relative. Indeed, when analysing the discourse of a given actor, analysts fill these slots by comparing its content to that of the actor who is criticized. This is important since the degree of radicalism of a conspiracy theory

Table 1. Forms and degrees of criticism.

	Beliefs	Actions	Intentions	Actors
Doubt	1	2	3	4
Re-prioritizing	5	6	7	8
Side-stepping	9	10	11	12
Revealing the Unknown	13	14	15	16

becomes highly dependent on the dominant discourse at a given time. The tool does not evaluate in any way the actual legitimacy of the discourses it is applied to.

Context and method

Context

I will now use this framework to analyse a specific vaccine-related controversy: the one surrounding the safety of the 2009 pandemic flu vaccine distributed in France.

In April 2009, the detection of a H1N1 strain of the flu triggered an unprecedented mobilization by international public health institutions and national governments which had been intensely preparing for a lethal pandemic since the beginning of the 2000s (Zylberman, 2013). In France, public authorities purchased 94 million doses of the vaccine and aimed to vaccinate 80% of the population. But after the announcement of the details of this campaign at the end of the month of August, a number of critiques were voiced against what was perceived as an over-reaction in the face of a minor illness (Sherlaw and Raude, 2013). The controversy over the vaccine's safety emerged in the media at the beginning of the month of September 2009, a couple of months before the launch of the vaccination campaign (November 2009). It lasted until the end of the 'swine flu' news cycle (January 2010). During this period, French public officials and a number of public health experts presented a common and coherent set of arguments defending the safety of this vaccine. The actors whose arguments I analyse here (nonprofits, unions, political parties, individual activists, bloggers, who I will call "actors") attacked these arguments on a variety of grounds. They tried to demonstrate that this vaccination campaign represented a risk for public health.

The case of vaccine-related controversies is perfectly suited for the research agenda mentioned at the beginning of this article. Firstly, there exists a hegemonic discourse on the subject. Public health authorities, both national and international, deliver marketing authorizations and recommendations for each vaccine. Secondly, these recommendations are transformed into a more general norm. Non-compliers

are publicly delegitimized and vaccine critics are publicly denounced as 'cult adherents', 'irrational' and 'obscurantists' (Leach and Fairhead, 2007; Blume, 2017) 2007; Blume, 2017. Public health officials and experts tend to assimilate all forms of vaccine criticism to its most radical forms ('anti-vaccinationism' and 'conspiracy theories') and to use the term 'antivaccine' in a polemical manner (Blume, 2006; Colgrove, 2006; Hobson-West, 2007; Johnston, 2004; Leach and Fairhead, 2007). These public discourses on vaccine criticism gloss over the variety of meanings that can be attributed to this medical intervention (Atlani-Duault et al., 2015; Leach and Fairhead, 2007; Nichter, 1995; Streefland, 2001; Ward, 2016). This inability to distinguish between the various forms of vaccine criticism has greatly hindered the understanding of vaccine related controversies and the social tensions at their roots (Blume, 2006; Leach and Fairhead, 2007; Ward, 2016).

Method

The sample of actors was selected in the following way. First, I analysed the coverage of the issue of vaccine safety produced by 21 of the main French news media between April 1, 2009 and January 31, 2010. I looked for identifiable actors who criticized the safety of this vaccine. I did not discriminate between the types of actors (individuals, collectives, bloggers, politicians, etc.) and chose to let the people involved in this controversy determine authorship for themselves either by choosing to speak in their own name or as representatives of collectives or even aliases (see Callon et al., 2011). I then conducted interviews with representatives of these collectives who were asked to name other important actors involved in this controversy. I identified a total of 19 individuals or groups (for more details on the actors and methodology, see Ward, 2016).

The tool I presented in the previous section was used as a coding scheme and applied to the public discourse of these actors during this period which comprised: 1) the contents presented in the media gathered through the analysis of 21 media sources but also through nominative keywords searches in two general media databases (Euro-presse and INAthèque), 2) their website(s), and 3) the documents mentioned during interviews

and/or given to me directly. I restricted analysis to the documents pertaining explicitly to the 2009 pandemic flu vaccine.

Results

Using this analytical tool, I will now break down the various forms of critique of the safety of the 2009 pandemic flu vaccine, thus revealing the ontological disagreements at the core of this controversy.

The orthodox position

Regarding the handling of the flu pandemic, some issues were hotly debated among public health officials: who should be vaccinated first? Should people be vaccinated in ad hoc locations or at their local GP's? Even the lethality of the flu was controversial among public health experts and deciders. However, safety of this vaccine was considered to be a 'solved issue' and both public health officials engaged in the handling of the flu and public health experts speaking in the media completely rejected the claims that this vaccine could be unsafe. So much so that officials did not mention the safety of the vaccine before the issue made front-page news at the beginning of September 2009. This means that the discourse presented by the defenders of this vaccine was produced in reaction to the critique made public by the media. This was the case throughout the whole period. Defenders of the safety of this vaccine, despite their diversity (ministries, public health organizations, experts integrated in the ministries' task force, experts loosely connected to this task force...), presented a very coherent discourse which I will call in the rest of the paper the 'orthodoxy'. Contrary to most controversies, the discourse presented by these defenders of the vaccine did not evolve much as they regarded the arguments presented by vaccine critics as completely null and void. New arguments were occasionally added later in response to specific criticism. I will present these more marginal arguments later with the critiques that elicited them. Here are the main aspects of this orthodox discourse.

Firstly, behind the idea that this vaccine was safe, was a general trust in the efficiency of the

procedures deployed to identify and measure its effects. For orthodox actors, the fact that the vaccine had to go through a marketing authorization process guaranteed its safety. Secondly, public health authorities recognized that some uncertainties remained. For instance, they were not sure whether it was safe enough to use adjuvants, substances such as aluminium or shark oil which increase the immune system's reaction to the vaccine, for children aged 6 months or less. But for them, the risks associated with unforeseen adverse effects were limited in two ways: 1) they recommended non-adjuvanted vaccines for those subgroups and 2) pharmacovigilance was intensified to allow for a potential re-assessment of these recommendations.

Interestingly, these arguments were presented relatively independently of the issue of the lethality of the pandemic flu virus. Even though the question of the danger of this virus was never quite solved during this period, these actors all presented the vaccine as safe regardless of these uncertainties. Their reasoning was twofold. Firstly, if the virus mutated into a version similar to the much feared Spanish flu of 1918-1919 (also an H1N1 strain), then the vaccine would definitely be less dangerous than the flu. Secondly, results from early clinical trials suggested that even if the virus was "only" as dangerous as the seasonal flu, the vaccine would still have a positive benefit/risk ratio.

A critique of vaccines and vaccination

A first set of arguments presented by critical actors pertained to what makes vaccines effective and what can make them have a negative effect on people's body. These arguments relate to how the physical world can be described which corresponds to the first column in our table: beliefs.

Doubt.

Many actors in our sample underlined the uncertainty regarding the safety of this vaccine but also regarding the danger of the flu. For instance, the non-profit *Health, Nature and Medicine* makes the following demand in their press release published in September 2009:

(*Health, Nature and Medicine*) demands scientific proof demonstrating that this vaccination is necessary and without danger, especially for pregnant women and young children, since hindsight on the side effect of this new hastily prepared vaccine will be almost inexistent.

As we can see, this form of critique is grounded in the same type of rationality as the one applied by public health organizations in their decision making process: risk assessment. Actors presenting this type of argument conform to the dominant form of apprehension of dangers as 'risks' and the associated focus on a posteriori computation of events in order to produce probabilities seen as predictors of the occurrence of such events (Douglas, 1990). This type of argument constitutes an insider's critique. Indeed, in the paradigm of risk assessment, the limit to a given judgment on the danger of a phenomenon is defined by the amount of data available concerning previous events involving this phenomenon. Here, actors such as *Health, Nature and Medicine* suggest that the risk assessment provided by public health officials does not translate the high uncertainty left by the gaps within their dataset. The same applies to arguments regarding the "real danger" of the virus. For instance, *Pharmacologist X* insists upon the lack of reliability of data regarding the deaths caused by this flu.

Re-prioritizing.

Most actors within our sample went further than simply raising doubts concerning public health officials' risk assessment. They inverted the hierarchy between the competing risks (virus vs vaccine). This was done by simultaneous presenting claims that the flu was not very dangerous ("as dangerous as seasonal flu" or "less dangerous than the seasonal flu") and claims that the vaccine was more dangerous than expected. In an interview broadcast in September 2009, *Pharmacologist X* develops on this commonly held view:

This use of the precautionary principle is appalling. It is used just in one way! Why don't we apply it to a vaccine that's been developed so hastily? Yet, it's easy to estimate the risk of a vaccine given to a great number of people (...). I calculated it. 20 million people will catch the flu with a death

rate of 1%: we get 20 000 deaths. We develop a vaccine in amateurish conditions that I've never seen before! Everyone knows that we don't detect serious side effects among 1000 patients during clinical trials. So, let's take the pessimistic hypothesis, as public health authorities do: we have 1 death for 1000 people. This gives us 60 000 deaths.

Side-stepping.

The core of the argument presented by public health officials consists in comparing quantitative measures of the risks of the flu and of the vaccine. In the two previous forms of critique, heterodox actors worked within this frame. However, most actors involved in this controversy did not stick to countering the assessments of public health authorities point by point. Most also mentioned an element that was not explicitly present in the orthodox discourse at the time: adjuvants. The main element of any vaccine is the antigen, a liquid containing the attenuated form of the virus meant to stimulate the immune system to create antibodies. Adjuvants are oil-like substances added in the vaccine which increase the body's reaction to the antigen. They allow using less antigen in each vaccine and increase its efficiency. For public health authorities, the use of adjuvants in the pandemic vaccine was not problematic and did not warrant a specific debate. On the contrary, most of the actors in our sample disagreed on this point defined adjuvants as a real problem and they concentrated a significant part of their discourse on their alleged dangers. According to them, the use of adjuvants increases uncertainties, arguing that their long term effects are not well known. Also, representatives of *Ecology and Health* - among others - insist that many adjuvants contain products known to have effects on the development of babies. According to them, adjuvants pose the same types of problems as endocrine disruptors whose effects are significant but difficult to measure because of multiple exposures.

Many commentators on vaccine criticism tend to analyse heterodox views of vaccines as grounded in age-old alternative visions of health such as homeopathy, chiropractic and naturopathy (Poland and Jacobson, 2011; Wolfe and Sharp, 2002). In doing so, they suggest that alternative and allopathic medicines are cast in stone.

This focus on adjuvants must be set against the backdrop of major transformations and tensions which have emerged partly within the institutional realm of allopathic medicine. One crucial trend has been the increasing focus of researchers on the effects of environmental pollution on health. As Francis Chateauraynaud, Josquin Debaz and Matthieu Fintz have shown, the emergence of this strand of research at the frontier between the political and academic spheres has renewed the understanding of the effects of the environment on the human body and challenged existing regulations of these risks (Chateauraynaud et al., 2011, 2014).

While this focus on adjuvants constitutes a significant departure from the orthodox position, it still denotes an important proximity. Indeed, in their responses, public health authorities recognized the fact that adjuvants exist and are used in these vaccines. They also recognized the fact that the various mechanisms linking environmental pollutions and bad health described by these actors exist or are plausible. They simply denied that they applied here or were sufficiently important to warrant a separate debate and a re-assessment of the risk/benefit ratio of this vaccine.

Health, Nature and Medicine presented another form of side-stepping. Their main spokesperson during the period gives the following advice in a document published online in October 2009:

Now that the science of immunology is better known, we know that the immune response is conditioned by the HLA system which is unique to each human being. We're discovering that it is ridiculous to build large-scale vaccination systems for individuals that are so different. (...) One piece of advice, remember to do a blood test before each vaccination to check if you already have the antibodies or if you are already incubating the disease!

This concern for the differing effects of drugs and diseases on people's health is part of a growing trend in contemporary medicine towards 'individualized' or 'personalized' medicine. While these differences in reactions to vaccines are admitted to be real by public health authorities, which led

them to prescribe a non-adjuvanted vaccine for specific subgroups such as pregnant mothers; 'individualized' medicine is not recognized as relevant by them when it comes to wide-scale vaccination campaigns. This is shown in the fact that despite worldwide recognition by public health authorities that a blood test can adequately tell whether the patient has the antibodies associated to the vaccine, they do not recognize pre-vaccine tests as part of vaccination campaigns.

Revealing the unknown.

All the previous arguments targeted the 2009 pandemic flu vaccine specifically. They respected the principle of judging each vaccine and each of its components separately. A small portion of our sample of actors went further in their critique and broke with this fundamental principle of public health ontology. These actors questioned the safety of vaccination in general. Among these typical 'antivaccine' arguments were claims that vaccines in general tend to weaken the immune system, to generate the infection rather than safeguard against it and more generally that they are poisons. These arguments were often grounded in neo-vitalist ontologies which present immunity as a form of equilibrium between the various fluids within the body (Johnston, 2004). While not all of the actors in this subgroup explicitly refer to homeopathy or naturopathy, they all emphasized the importance of the "terrain", the individual physical capacity to fight off any exterior aggression, and downplay the role of viruses in bad health (for more detail about these arguments, see Dubé et al., 2015; Kata, 2010; Streefland, 2001; Wiese, 1996).

It is important to note that these actors propose an alternative definition of immunity, one that is not recognized as relevant or even worthy of discussion by public health authorities and mainstream biomedicine in general. Indeed, while public health authorities and experts have tried to counter the arguments presented in the previous sections, they made no effort to answer the arguments relating to vaccination in general, apart from general declarations on "the importance of vaccines" and the usual delegitimation of obscurantist "antivaccinationists". This is not surprising since the invention of

vaccines was crucial in the emergence of the main paradigm in contemporary biomedicine: microbiology (Moulin, 1991). These forms of critique are part of a long tradition of resistance towards the paradigm of microbiology which started to dominate in medical academia at the end of the 19th century. These forms of critique are grounded in the then legitimate medical theories that were being supplanted by microbiology. These medical theories did not die with Pasteur and the fight on the issue of what constitutes good medical science has continued ever since, even if resources available for each side have been increasingly unequal.

But actors in our sample did not restrict their demonstration to medical considerations. Indeed, most of the arguments I just presented, to be true, imply institutional failings in the organization of this vaccination campaign.

A critique of those who make and recommend vaccines

Critical discourse was also directed to the reality of the claims made by public health authorities to have done everything in their power to guarantee this vaccine's safety. I will now analyse the social ontologies underlying this more classically political form of critique which correspond to the three remaining columns in my synthetic table (actions, intentions and actors). For convenience, I will present them together.

Doubt.

A first form of critique simply consisted in questioning whether the orthodox description of the decision making process that led to this vaccination campaign was accurate.

Many actors denounced the lack of "transparency" on a number of crucial subjects: which adjuvants will be used? What are the side effects identified during clinical trials? Will pharmaceutical companies be held responsible when adverse events occur? This was the core of the message of an important petition signed by the *Far Left Party* demanding that "the debate be open" on this campaign. This was often linked to the ethical issue of providing the public with enough information for them to make an informed decision. These doubts regarding the actions undertaken were

often combined with a similar attitude toward public officials' claims that the best interest of the population was their main concern. Such claims were pervasive in the discourse of public health authorities from the beginning of the pandemic to well after the last vaccination site closed in February 2010. This was especially the case once the French news media started debating on the alleged conflicts of interests of special advisors to the World Health Organisation and to the French Minister for health at the beginning of the month of November. Public health officials admitted that financial motives were part of public health decisions since on the one hand pharmaceutical companies' *raison d'être* was to make profit and, on the other, a large vaccination campaign could not take place without pharmaceutical companies producing these vaccines. At the same time, officials claimed that the well-designed institutional processes for the distribution of these vaccines were effective in restricting the influence of these financial interests. These considerations were part of their answer to the doubts expressed by most of the actors in our sample.

These doubts regarding actions and intentions were completely intertwined with doubts regarding who really made these decisions. Public health officials claimed to have been the sole actors in charge of deciding to recommend the vaccine. According to them, pharmaceutical companies were not integrated in the process apart from consultations on practical issues such as pricing and production.

As Anthony Giddens has showed, uncertainty is a fundamental feature of 'late-modern' societies (Giddens, 1991a, 1991b). Because these societies feature intricate institutional 'abstract systems', people's experiences of danger and risk become delocalized and trust becomes a central issue. While public authorities have the tendency to suppress these uncertainties in their public communications, social movements of all kinds have participated in diffusing a consciousness of these uncertainties, especially on health related subjects. These critiques of opacity in this vaccination campaign are therefore in direct line with the intensification of mobilizations against paternalism in medicine and, more generally, consumer rights, since the 1960s (O'Neill, 2002).

Re-prioritizing.

All of our actors but one went further than simply raising doubts.

They claimed that the authorities did not take the actions they claimed to have taken. This took the form of claims that the vaccine was “not sufficiently tested” and that public health authorities did not gather enough information to buttress their claims regarding the severity of the flu. Some also challenged the claim that the public was given all the information required to make an informed decision. This took the form of a denunciation of the bias in the presentation of information. For instance, during the month of November, *Nurses’ Union X* regularly denounced the focus in public health authorities’ communication on benign adverse effects of vaccines and its alarming tone regarding the virus. Some used harsher terms, such as “propaganda”, to present a similar argument.

They also judged that public health authorities undermined the actual influence pharmaceutical companies and their financial interest. The mechanism through which the control by pharmaceutical companies was exerted on public health officials was presented with varying degrees of precision. Some accused experts in the advisory committees of national and international public health organizations (such as the World Health Organisation, the European Council, the European Medicine Agency...) of having conflicts of interests. Some spoke more bluntly of a “control of pharmaceutical companies over the studies that evaluate vaccines” (*Journalist X*) or, more generally, of a control over public health representatives and of “experts paid by labs” (*Far Left Party*).

This form of critique can appear extreme in some of its expressions, with for instance the wide use of the term “corruption”. But it is important to note that it is targeted on actors who are recognized by public health authorities as part of the institutional decision-making process of this vaccination campaign. The same goes for the part of this argument pertaining to the motives behind these decisions. Claims that pharmaceutical companies’ financial interests were the main motive behind this vaccination campaign were occasionally formulated in a brutal manner. But the intentions supposed to have guided this vacci-

nation campaign remain those commonly recognized – even by public health officials - as those of pharmaceutical companies: profit.

Denunciation of conflicts of interests has also become a classical repertoire of critique in the domain of health since the emergence of consumer rights and ecological social movements (Chateauraynaud et al., 2014; Conis, 2014; O’Neill, 2002). Such mobilizations have led to major transformations in national legal systems, with laws pertaining to conflicts of interests being enacted, major scandals arising in the mainstream media, etc.

Side-stepping.

The previous arguments focused on the actions public health officials claimed to have taken, and on actors and intentions recognized by public health officials to be part of normal institutional decision-making processes. I will now turn to the actors who suggested that other groups or people were involved in this campaign, that deciders took other measures and/or had ulterior motives.

One of these alleged secret actions was that the French government used its institutional resources to put pressure on nurses and medical professionals to vaccinate and get vaccinated and on the media to spread positive information about this vaccine. Some also claimed that the government guaranteed that pharmaceutical companies would not face charges in case of adverse events and denounced this “impunity”.

These forms of critique depart from the discourse of public health authorities not only by negating the existence of the actions claimed to have been taken, but also by suggesting the existence of a different set of actions. These hidden actions nevertheless stay within the boundaries of a social ontology shared with orthodox actors. Indeed, the existence of the kind of biases and strategic communicating mentioned in the previous section, and the kind of institutional pressure and bargaining I just mentioned are part of contemporary political common sense. The existence of such actions in the world of policy making and sociotechnical controversies is admitted and they appear as plausible a minima. Indeed, public health officials and experts accuse “antivaccinationists” of such acts. Another piece of

evidence of the inclusion of such hidden actions in the ontology of the social world underlying the orthodox discourse is the fact that public health authorities publicly responded to these accusations with lengthy arguments detailing exactly what they had done.

A minority of critical actors also attributed another set of intentions more grounded in traditional political cultures. They claimed that the intention behind public health authorities' decision to organize this large-scale vaccination campaign was to cover themselves in case the flu was really dangerous. Their intentions were therefore political self-interest based on a distorted use of the precautionary principle. They accused the government of wanting to "appear to be active" and to score political points. Others claimed that the underlying impetus behind this campaign was ideological. *Far Left Party*, for instance, used this argument in the opening line of their September "dossier" on the pandemic:

Fear is a market, and a policy. The flu, after foreigners and urban youths, allows the government all kinds of wrongdoings that reveal its secret desires: free market and a strong State.

Other actors denounced the focus of the government on the cost of sick leave for the economy. These arguments targeted the right-wing political orientation of government at the time of this pandemic.

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These forms of critique constitute a significant side-step compared to the discourse of public health authorities. Orthodox actors framed the pandemic as an a-political issue, a very common frame for health and risk-related policies, especially in France (Borraz et al., 2007). While the existence of political bias and political self-interest are commonly accepted by all politicians, experts and bureaucrats, orthodox actors did not accept that this was an issue in this particular case. This form of critique constitutes a very classical repertoire of critique. However, the critique consisting in pointing to politicians' self-interest has gained unprecedented popular appeal in the past decades with a general decline in trust in public servants since the end of the 1970s, especially in France (Inglehart and Welzel, 2005). It constitutes a form of resistance towards the professionalization of a political and administrative class and its

social consequences (see for instance: (Bourdieu, 1998)).

Among the crucial points my analytical tool revealed is that almost all critical actors restrained this side-stepping to the actions and intentions of public health authorities. Only two of them suggested that some hidden actors played a role in this process.

The leader of the Party of Life, in an address at a convention of an “anti-Zionist” political movement, suggested that “militant Zionists” and “financial and military elites” were behind this campaign. Justice For All is the other actor. This non-profit filed a lawsuit in July 2009 for “preparation of a crime of genocide” (sic). In their brief, they pointed to another set of actors: Barack Obama, the United Nations, bankers (David de Rothschild, David Rockefeller and George Soros in particular) and, in other documents, towards the Federal Bureau of Investigation, the Federal Reserve and the Bilderberg Group. The activist behind this non-profit also mentions the crucial role played by Freemasons in unifying the actions of these different groups.

No-one among the French political elite denies that Barack Obama or the FBI exist and even if they are probably wary of the term “elite” and probably define it in slightly different ways. Their decisions are premised on the fact that some actors are more important than others and should therefore be included in discussions and negotiations relative to policies. The existence of Freemasons is also widely recognized as real. However, nowhere in the public health authorities’ multiple public discourses is there a reference to this specific choice of actors (except for Barack Obama but in a very different way: as important in decisions pertaining to vaccination in the US only). The idea that they matter in the process that led to the organization of the French vaccination campaign is very exotic compared to how this process was presented by orthodox actors: institutional negotiations between national and international public health agencies and political organizations (such as those that compose the European Union), governments, representatives of public health professionals, public health experts and pharmaceutical companies. This choice of actors to include as relevant does not respect the premise

of public health authorities’ own description of the institutional world of contemporary nation states and international coordination as characterized by: 1) thematic specialization, 2) a social division of labour (in this case the institutionalization of the specific professional and economic domain of health and medicine), and 3) a political unification guaranteed by the institutions that compose national states and international cooperation structures.

With this form of critique - side-stepping applied to actors - we enter into the realm of conspiracy theories as they have been approached by contemporary anthropology. This form of critique consists at least partly in denouncing the secret actions of enemies within (Goldberg, 2008). They point to traditional scapegoats antedating the emergence of the French State and the intensifying globalization of the 20th century - the Jews (Pipes, 1999). This illustrates Harry West and Todd Sanders’s point that reactions to globalization are embedded in the past and in local cultures (West and Sanders, 2003; see also Dingwall et al., 2013). The reference to Freemasons is a more recent form of critique of power. It is grounded in the emergence of national states and of the type of political elites associated with this new form of organization of power. It seems that one of the major transformations of this social ontology with globalization has been its internationalization and a greater importance given to private companies. But another important evolution in the discourse on Freemasonry has been its hybridization with emerging discourses on Unidentified Flying Objects (UFOs) and aliens as we will see now.

Revealing the unknown.

Justice For All is the only actor to go even further and suggest that the most important actors are ones that are not recognized as existing by all actors from the French mainstream politics: the Illuminati-Reptilians. According to the activist behind this non-profit, the illuminati are the “elites of freemasonry” and their goal is to establish a “New World Order”. They control all important organizations, such as the ones mentioned in the previous section. Documents of Justice for all suggest that they are actually extra-terrestrial

beings who came to earth to exploit the planet and the human race. According to them, because of the work of the illuminati, data concerning the existence and sightings of UFOs is not released to the public. This prevents the world from recognizing the truth, which was what John F. Kennedy wanted to do and the reason he was assassinated.

Such descriptions of the social world have a long and complicated history linked to the emergence of occultism in European salons at the end of the 18th century, the emergence of theosophy at the end of the 19th century, and, more recently, the tales of UFO sightings and the popular success of Erich von Daniken's tales of "the ancient astronauts" who founded all major civilisations (Stoczkowski, 1999). It is unclear exactly what kind of power relations are targeted through this form of social aetiology except for the kinds mentioned in the previous sections. Wiktor Stoczkowski (1999) argues that occultism

and, more importantly, theosophism constituted forms of protest against the claim by Christian institutions to the monopoly on discourses on the fundamental texture of the world. The increase of cultural exchanges with Asia and South America during the second half of the 19th century enabled to frame this discontent around the issue of European ethnocentrism. Following Jodi Dean, Ufology can be interpreted as a similar type of protest but applied to Science as the new central institution in charge of stating what is real but also as a political project inseparable from the expansion of the realm of nation-States during and after the Second World War (Dean, 1998). Recent studies devoted to forms of esotericism that share traits with the discourse of Justice For All have also analysed them as critiques of how scientific materialism is presented as a tool to orient the life of the people toward economic activities (Asprem and Granholm, 2012). The influence and nature of

Table 2. Types and degrees of critique of the safety of the French pandemic flu vaccine.

	Beliefs	Actions	Intentions	Actors
Doubt	Is the flu so dangerous?	Lack of transparency	Doubt that the public's interest prevailed	Doubt that public health authorities were the main actors
	Is the vaccine safe?			
Re-prioritization	The vaccine is more dangerous than the flu	The authorities did not do everything in their power	Financial interests prevailed over the public's interest	Conflicts of interests
		Authorities only give part of existing information		Pharmaceutical companies control the process
Side-stepping	Adjuvants are unsafe	Behind the scene pressure to vaccinate more	Politicians and public servants' interests prevailed	Other actors: Zionists, freemasons, Bildenberg Group...
	Personalized medicine	Big pharma is protected	Ideological motives prevailed	
Revealing the Unknown	Rejection of all vaccines	Vaccines were poisoned	Instauring a New World Order	Secret actors: the illuminati
	Alternative conceptions of immunity		Mass genocide	

traditional scapegoats seem to be reinterpreted through this lens.

While *Justice for All* was the only one to talk about secret beings, several other actors presented radical revelations either on the intentions behind this pandemic or on the actions that really took place. They most often did so without really specifying who was responsible for these actions, for instance by using the pronoun “they”. Indeed, a small minority of actors claimed that public health authorities (or whoever is in charge) added substances known to cause more harm than good in order to poison the population (see for instance the lawsuit I mentioned before). Also, the non-profit *Justice For All* claimed that authorities put microchips in these vaccines in order to set up a general surveillance of the population. This minority of actors also added a repertoire of motives that went much further than the arguments presented in the previous section and denied the possibility of benevolence or positive actions on the part of public health officials.

Indeed, for actors such as *Life’s political party*, the real motive behind this vaccination campaign was a will to impose a “New World Order” characterized by the oppression of the masses. In this type of argument, self-interest becomes wilful wrongdoing. This actor and *Justice For All* added the theme of eugenics by affirming that the vaccination campaign is actually a Malthusian policy meant to reduce the population of developed countries in order to maintain this New World Order.

Discussion and conclusion

Using the coding scheme presented in table 2, I summarized the positions of vaccine critics in simple tables (see Appendix 1). In this particular case, one table per actor was enough to summarize their critique because there was very little evolution in their discourse during this short controversy. But it is also possible to use this analytical tool to show the evolution of the position of

Table 3. Health Nature and Medicine’s discourse in the media.

Health, Nature and Medicine

	Beliefs	Actions	Intentions	Actors
Doubt				
Re-prioritizing				
Side-stepping				
Revealing the Unknown				

actors across time or their choices of repertoires of critique depending on where they voice it (the media, administrative arenas, academic journals, etc.). This can be simply done by producing several tables. For instance, the *Health Nature and Medicine's* website presented contents that departed significantly from the very tame critique they made in their media appearances and in their letter to the European Medicines Agency (see Appendix 1). References to individualized medicine, to alternative conceptions of immunity and to the New World Order disappear in the latter.

This shows both a will to appear publicly as moderate but also dissension within the group on the subject of what constitutes a legitimate form of criticism.

Also, because this analysis approaches critique in relation to a dominant discourse of reference, it helps avoid reifying radicalism. Critical discourses are not radical in themselves. They are radical in relation to another presentation of reality. For instance, the table would be very different in a context where anti-Semitism is widespread or where homeopathy is the norm. This coding scheme is a flexible tool which needs to be adapted to the specific context and controversy under scrutiny.

The analytical tool presented here helps shed light on the diversity of actors involved in a particular controversy but also the way repertoires of critique are shared between them. This is particularly crucial when studying vaccine-related controversies. There is a general tendency in the public health literature to lump all forms of vaccine criticism together and to treat as equivalent arguments pertaining to side effects, conflicts of interests, natural immunity and plans to poison the world (Hobson-West, 2007; Johnston, 2004; Ward, 2016). The tables presented here paint a very different picture. Some arguments do tend to be presented together and these bundles mix medical and social aetiologies. But clear delimitations also appear, suggesting the diversity of social movements involved in vaccine criticism as well as processes of boundary-making and tensions within these mobilisations (see Ward, 2016). As we can see, almost all of our actors presented arguments pertaining to the balance between the risks and benefits of this vaccine

and to the risks of adjuvants. These arguments were even presented by actors who developed much more general theories of how vaccination necessarily has a degrading effect on health even though these theories render conditional forms of critique redundant. The simultaneous presentation of these arguments should appear surprising. Indeed, the medical ontology behind the idea that adjuvants can cause long-term damages is based on a form of mainstream microbiology. It is incompatible with the alternative theories of immunity that ground the rejection of the principle of vaccination, as we have seen in the first part of the results section. The ontological pluralism of radical critiques is not limited to medical aetiology. For instance, *Life's political party* and *Informed Freedom in Health* both combine denunciation of the influence of hidden actors and the language of conflicts of interest.

This ontological pluralism must be set against the backdrop of the public stigmatisation of the "antivaccine movement" and of "conspiracy theorists". Its correlate is that the actors whose form of critique is labelled in such a way are marginalised and cannot have access to central arenas of debate and decision-making. For instance, in our case study, the media coverage of critics was almost entirely focused on the actors who restricted their critique to the pandemic vaccine and to the role of pharmaceutical companies in the campaign. Indeed, these differences in forms of critique do not appear out of thin air. They are closely linked to the trajectory that led these actors to take an interest in this vaccine. Those who only produced a conditional critique of this vaccine have a variety of backgrounds (environmental health movement, patients' rights movement, political parties, a nurses' union, an epidemiologist...). But they all have in common the fact that they are part of what Pierre Bourdieu would call the dominant political and medical fields (Bourdieu, 1977). They are all at least somewhat integrated to the arenas of debate and decisions around health related issues. For instance, one of them is a member of the prestigious Academy of Medicine. *Ecology and Health* comprises several researchers from French public research institutions and has been able to successfully lobby the European Union on the issue of

BPA. *Far left party* and the *Green party* have many elected representatives at various levels of the French administration. To use Bourdieu's vocabulary, these actors can be seen as involved in the political and/or medical "games". They are vying for the resources these two fields have to offer. Their form of critique translates the fact that they are playing this game, and that they recognize a minima the legitimacy of the institutions they wish to be integrated to - the first and foremost being the State in its different forms. The contrast is striking with the actors who presented more radical forms of critique. The fact that they deny any legitimacy to official and scientific institutions is inseparable from the fact that they are not involved in these arenas of debates. These medical and scientific ontologies are closely connected to the way these various actors find the resources for their mobilisation in relationship with political and scientific institutions.

This analytical tool is not without its limitations and challenges. Its focus on discourse and ontology has several consequences. It does not directly apply to many crucial forms of actions pertaining to the political treatment of science and technology (regulations, political influence, financial transactions...). Its heuristic power and ease of use depends on whether the discourses under scrutiny are elaborate, explicit and engage with the actor's opponent's arguments. In my case study, the main coding difficulties came from texts which adopted very polemical tones and made heavy use of irony and rhetorical questions. This often made it difficult to distinguish between Doubt and Re-prioritizing, especially on issues of transparency and corporate influence. For instance, this was the case of a long speech written and read by the leader of Life's political party. In this speech addressed to the Minister of health, each paragraph started with a bold explicit or implicit accusation such as: "you lie", "you have put your talent (...) at the service of the industry of on-prescription poison", "Why do you think 60% of doctors and medical professionals (...) refuse vaccination for others even more than for themselves?". However, the following sentences

were always much more nuanced, questioning whether the Minister's actions were voluntary or even suggesting that the decisions she took were not really the product of the industry's interference but that of her personal "naïve" beliefs. In this case as in others, I chose to code conservatively, treating rhetorical questions as Doubts and focusing on the more explicit claims. Because in all problematic cases my actors had made more explicit statements in other documents, this conservative approach did not raise particular issues for the analysis. But taking all of the actor's production together also means that there can be a risk of assigning the actor to its most radical statements (or spokesperson) as could have been the case for Health, Nature and Medicine as I discussed at the beginning of this section. This rather intellectualistic bias also means that this tool sets aside the various genres and styles of intervention specific to each platform and arena. Finally, the choice of actor of reference (the "orthodoxy" in my case study for instance) constitutes a crucial issue and should depend on what the analysts' research questions are. It might also be that in many controversies such a coding scheme only applies to some aspects of the controversy or that it is necessary to develop two or more separate coding schemes.

The analytical tool presented in this paper has enabled me to break down the ontological disagreements underlying the controversy over the 2009 pandemic flu vaccine's safety. It has also enabled me to underline the ontological pluralism present in some critical actors' discourse. I believe its combination of a simple definition of critique and an adaptable decomposition of the social world makes it applicable to a great variety of issues by a variety of analysts. I also believe that it constitutes an addition to the portfolio of tools developed in the field of STS. It could especially be fruitful when combined with digital methods developed recently to "map" controversies as they leave an important space to qualitative coding schemes (Marres, 2015). Future explorations should help judge whether or not this is the case.

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Notes

- 1 While he does not provide an explicit definition of what discourse is, Boltanski (2011) uses the term to describe a variety of enunciations, written or oral, produced in any social setting. While he tends to focus on what is explicitly stated by the actor, his analysis also applies to the often implicit ontological premises of these statements.

Appendix 1. Arguments presented by the 19 main actors who criticized the French pandemic flu vaccine.

Each table presents a summary of an actor's critique of the pandemic flu vaccine. The contents of the columns and lines are presented in the table below. By intersecting the two dimensions of the typology presented in this paper, these tables allow assessing the degree and type of each actor's critique.

Infectious Diseases Expert X

	Beliefs	Actions	Intentions	Actors
Doubt	Shaded	Shaded	Shaded	
Re-prioritizing	Shaded	Shaded		
Side-stepping				
Revealing the Unknown				

