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Public perception of scientific advisory bodies: the case of France's Covid-19 Scientific Council

Abstract

During the Covid-19 pandemic, many governments have resorted to scientific advisory bodies to aid in public health decision-making. What then has been the public's perception of those new structures of scientific advice? In this article, we draw on a survey conducted in November 2020 among a representative sample of the French adult population (n=1,004) designed specifically to explore public perceptions of the dedicated Covid-19 Scientific Council created in March 2020 and of scientific advice in general. After only eight months, three quarters of French people said they had heard of it, but only a quarter had a positive opinion about its usefulness. Despite the diversity of perceptions of what scientific advice is and should be, it appeared that scientific advice bodies are perceived as useful mainly by a public already largely supportive of delegation of the management of public life to the government and public institutions.

Keywords : scientific advice ; France ; Covid-19 ; health policy ; public perception

Introduction

Since the beginning of the Covid-19 pandemic in 2020, many governments have publicly emphasised the importance of “following the science” and lead evidence-based policies (Atkinson et al., 2020; Cairney, 2021; Colman et al., 2021; Weingart et al., 2022)□. Managing the pandemic and its many uncertainties has mobilised scientific knowledge and researchers in an exceptional way, touching a variety of disciplines and addressing issues ranging from medically-focused treatment (Pearson, 2021) and the physics of aerosol dispersions (Alsved et al., 2020), to the place of social networks in the dissemination of information (Tsao et al., 2021) and the organisation of research itself (Fraser et al., 2021)□.

In order to keep up with the rapid evolution of knowledge about the new virus and translate it into practical recommendations, and to compensate for the variable quality of available knowledge (Quinn et al., 2021)□, many countries have resorted to scientific advisory bodies, whether already existing such as the Scientific Advisory Group for Emergencies (SAGE) in the United Kingdom (Evans, 2021), or new ones such as the US Covid-19 Advisory Board created by Joe Biden (Subbaraman, 2020) and France's Covid-19 Scientific Council (Atlani-Duault et al., 2020; Bergeron et al., 2020; Rozenblum, 2021).

These scientific advice bodies can take various forms but generally concentrate on providing expertise for elected officials, ministerial advisers, crisis units or health agencies, in order to devise the best strategies in a context of great uncertainty. However, in numerous countries, this role was coupled with a public dimension (Hilgartner, 2000)□, with many governments invoking the weight of science to support their choices (Mercuri, 2020)□. Given the importance of informing the public and justifying decisions, political actors have given prominence to these groups of experts, presenting some (unpopular) decisions - such as lockdowns - as based on their advice and even appearing alongside them on television. This public dimension of expertise features prominently in good practice recommendations for scientific advice to policy makers during crisis situations (OECD, 2020). One of the main issues in pandemic management is therefore “how the public receives these strategies, i.e. how much they trust politicians and/or scientists, and how much reliance on science helps to legitimate political decisions” (Weingart et al., 2022).

This emphasis on the science-based dimension of decisions— “regulatory science” – is understandable. In the context of a pandemic, it is crucial to mobilise the population because many of the necessary measures must be implemented by the public itself: wearing a mask,

restricting contact, getting vaccinated, isolation in case of doubt over infection, etc. The role of these scientific bodies is therefore to produce recommendations but also, if they are implemented, to justify them. For this reason, such bodies embody a specific form of socially and historically constituted authority: that of science. This is often referred to in work on the perception of science as the “cultural authority of science” (Bauer et al., 2018; Gauchat, 2012)□. This refers to the fact that, in most social contexts in contemporary societies, greater credibility is attributed to information produced by scientists and science’s institutions. Its use by the political authorities is aimed at assuring the public that the decisions and recommendations are aimed at the common good and transcend partisan disagreements and particular interests.

This recourse to the legitimacy of science and scientific expertise is thus an integral part of health management in numerous countries. While much attention has been paid to political decision-makers that have openly turned away from scientific recommendations and criticised experts, such as in Brazil (Boschiero et al., 2021) or in the USA, and the effect of this stance on their constituents (Shepherd et al., 2020), it is equally important to study the effect on public perceptions when decision-makers push scientists forward to centre-stage (Weingart et al., 2022). For example, the “staging” of the authority of science is double-edged as it can also lead to suspicion of manipulation (Evans and Hargittai, 2020; Hilgartner, 2000). The context in which the pandemic takes place is likely to reinforce such interpretations, and “science advice thus occupies a precarious position on the boundary between asserting facts and making policy” (Hilgartner et al., 2021). Moreover, the pandemic emerged in a context of intensifying debate on scientific credibility and its relationship with political and industrial actors. Public forms of expertise are regularly questioned, particularly on health issues, whether because of suspicions about experts’ independence (Eyal, 2019) or concerns about technocratic “drift” into matters beyond their competence (Nowlin, 2020).

What then has been the public’s perception of scientific advice and how are these perceptions related to issues of trust, politicisation and attitudes towards science? If science is staged, who is its audience ? More than three years after the start of the pandemic, there is still little empirical work on how the public perceived this association between science and policy, although some some research has explored interdependencies between trust in politics, trust in science and the perceived threat of the pandemic (Weingart et al., 2022).

Among the countries that have emphasised the importance of scientific advice, the case of France is an interesting and still under-investigated example. Scientific advice was put to the forefront of public communication by the Government at the start of the pandemic with the creation of a new advisory body. On 12 March 2020, President Emmanuel Macron declared in one of his first speeches on the Covid-19 epidemic that “one principle guides us in defining our actions [...]:confidence in science”. Two days before, the Minister of Health had created a new entity, the Covid-19 Scientific Council, made up of 11 scientists, mostly from the medical field, with the mission, enshrined in the law (decree of 3 April 2020), of producing publicised opinions and internal notes.

During the course of 2020, the advisory notices issued by the Council were widely used to justify decisions by the government, and extensively discussed in the media. This political recourse to scientific expertise took place in a context of strong distrust of the government, which has led to a strong politicisation of the debates on a variety of issues such as the imposition of lockdowns, their modalities, the closure and reopening of schools, epidemiological modelling, the arrival of vaccination and its deployment, and more recently the “health pass” that people were required to carry with themhad to show to access a number of public spaces (Ward et al., 2022).

In this article, we draw on a survey conducted in November 2020 among a representative sample of the French adult population (n=1,004). The survey took place during the second wave of Covid-19 infections in France and was designed specifically to explore public perceptions of scientific advice during the first year of the Covid-19 pandemic. We start by shedding light on the tensions surrounding expertise, drawing on literatures on the institutionalisation of expertise. After presenting our survey, we focus on the perception of the Scientific Council to show firstly that despite the large amount of publicity during the first year of the pandemic, a sizeable segment of the public takes no interest or does not feel legitimate enough to have an opinion on these issues. We then show that for those who are invested enough in these debates to have an opinion on expertise, their perceptions are irreducible either to general attitudes towards science or to general attitudes towards politics, indicating an intertwining of those two factors when it comes to science for politics. This calls for a finer understanding of how the scientific authority of science nested in the state administration – associated with regulatory science - can maintain its legitimacy when its autonomy is under scrutiny.

Scientific advice bodies at the interface of the public perception of science and politics

Unlike other health agencies that provide expertise in support of public decision-making in the French health system such as *Santé Publique France* (SPF), the *Haute Autorité de Santé* (HAS), the *Agence Nationale de Sécurité du Médicament*, the *Haut Conseil à la Santé Publique* (HCSP) or scientific advice institutions such as the *Académie de Médecine* or the *Académie des Sciences*, the work of the Scientific Council (henceforth the Council) has been widely publicised from the very beginning of the Covid-19 pandemic (Rozenblum, 2021). Its opinions, given in the form of “advisories”, have been regularly presented in support of government decisions, such as the first lockdown on 17 March 2020. But those advisories were not systematically followed, such as one advising that schools be kept closed until September 2020. As an “insider” adviser to government management (Cairney, 2021), the Council’s relationship with the government and the occasional gaps between its opinions and government decisions have been scrutinised continuously since the beginning of the health crisis by the media and opposition politicians.

When public perception of scientific advice is studied, it is generally either in terms of trust in science (Algan et al., 2021) or in terms of political responsibility for given decisions (Smallman, 2020). Such a separation is important because it delimits two distinct forms of legitimacy, scientific and political, whose cohabitation is conditional. Indeed, in order to claim the authority of science and bring about concrete impacts on health behaviour, scientific advices must be seen as independent to avoid being perceived as political rhetoric. Thus, as some observers pointed out, during the Covid-19 pandemic

there is a genuine dilemma. Advisory [bodies] created directly by governments to support decision-making have the best chance of informing policy in practice. Yet being close to government may undermine public perceptions of and confidence in their independence and trustworthiness (Williams et al., 2020).

The representatives of advisory bodies are conscious of this issue (Brandmayr, 2020), and are keen to give proof of their autonomy by engaging in boundary work based on rules of transparency and independence (Bijker et al., 2009; Hilgartner, 2000)□.

The inception of the French Covid-19 Scientific Council Covid underlines the importance of taking a closer look at the public staging of expertise and its effect on the population. After a

first informal meeting on the 5th of March 2020, a group of researchers were officially invited by the Ministry of Health to form the Council on the 12th. On the 13th, as they gathered for the first time to give advice before the first presidential declaration scheduled for that evening, they faced the issue of their public role by filling out public declarations of interest, and defined their own rules for working together. Aware of the importance of a clear delimitation between advice and decision, they requested their reports be made public on the Ministry of Health's website and that they retain freedom of speech.

Directly after the presidential address, the Council was widely covered by the media, and their identity became known publicly by a non-official picture taken the day before. In the following weeks, Council was the subject of various public debates, from the legitimacy of each individual member to the Council's specific advice on lockdown or the closing of schools. The Council took an important place in the debates of the first months of the pandemic, despite the growing discrepancy between its advice and the government's decisions.

At the time of the survey, when anxiety and uncertainty were high, one would expect that the public's perceptions of the Council to reflect its location at the interface between science and politics, associated either with political management by the government, or with scientific legitimacy. We therefore formulated two hypotheses regarding the main factors bearing on public perception of this use of science:

- (H1) Perceptions of the role of scientific expertise in crisis management and of scientific advice *per se* are determined by attitudes towards science in general. The Council, would then be perceived mainly as belonging to the scientific world.
- (H2) Perceptions of the role of scientific expertise in crisis management and of scientific advice *per se* are determined by attitudes towards politics. The Council, would then be associated with the political actions of the government and its perception would depend on the political beliefs of individuals.

Hypothesis (H1) corresponds to the association of expertise with the general authority of science. Since at least the 1960s, a great deal of work has investigated attitudes towards science, looking at factors ranging from mastery of canonical scientific facts and the degree of interest in scientific research, to trust in science or in scientific researchers (Bauer et al., 2007). This association is reflected in the place attributed to scientific knowledge at a variety of institutional levels in societies, ranging from the courts and the production of goods to the political management of pandemics. A stream of research has explored the authority of science on various aspects of social life such as opinions on scientific issues like genetically modified crops, nuclear power, or vaccines (Eyal, 2019; Sturgis and Allum, 2004).

Hypothesis (H2) prioritizes the political framing of scientific advice in the public arena, in which the Council is part of the public debate on the political management of the crisis. Such an association of scientific research with political debate and action is not specific to Covid-19. Many researchers have noted that scientific issues such as evolutionary theory, global warming, and vaccination have entered political debates in a number of countries (Eyal, 2019). This has two implications. First, some scientific topics are brought to people's attention via cultural practices that are not science-centred (e.g. reading popular journals, visiting museums) but are politically centred, (e.g. reading the political pages of newspapers) (Bauer et al., 2018). Secondly, public debates about research on these topics are not only held by scientists themselves but also by individuals associated with political activity, in particular party representatives. The public is thus provided with "cues" suggesting that they read these issues through the prism of their political identity (Motta, 2018). Numerous studies have

shown that partisan identities can be one of the main factors explaining differences in perception of scientific subjects, and more particularly on the themes associated with Covid-19 (Shepherd et al., 2020).

These two hypotheses may not be mutually exclusive. Indeed, science and technology studies (STS) have clearly shown the complexity of the relationship between science and policy, and the different degrees of “overlap” between the two, depending on the fields of research and the subjects chosen (Frickel and Moore, 2006). Such overlap could be found at the level of public perceptions. Indeed, one of the main findings of research on public perception of scientific issues is that political views influence the perception of some topics and not others, and do so in different ways depending on the degree of engagement with politics (Blank and Shaw, 2015; Drummond and Fischhoff, 2017; Hilgartner et al., 2021; Merkley, 2020).

In this study, we proposed both to test the two hypotheses on how the Council is perceived in France and to explore how relationships between science and politics are represented when they are staged together.

Methodology

Data collection

We conducted a questionnaire survey from 13 to 16 November 2020 on a representative sample of the French adult population. The data were collected by the French Institute of Public Opinion (IFOP) with self-administered online questionnaires sent to members of an online panel of more than 700,000 participants (Bilendi). The representativeness of the sample was attained by quota sampling. The sample was built to match the French adult population with regards to gender, age, type of professional occupation and population density in the region of residence (as per official census data). The enrolment of respondents continued until the necessary proportions were achieved. A weighting procedure was applied to adjust for the rare cases where the quotas were not met at 100%. The questionnaire (see Supplementary) included questions on (1) the socio-economic and health profile of the respondents; (2) their attitude towards the Council; (3) their attitude towards the management of the pandemic by the government and towards different scientific and political institutions; (4) their attitude towards the place of scientific knowledge in policy-making. The socio-economic and health profile includes gender, age, household size, income, and having had or knowing someone who has had Covid-19.

Perception of the Council was measured by three questions. The first question asked about awareness of the Council as well as other organisations (national and international health agencies, National Academy of Medicine, etc.) involved in the management of the Covid-19 crisis. The second, limited to respondents with at least some knowledge of the Council, is their opinion on its usefulness in the management of the Covid-19 crisis. The third presented a series of statements regarding the Council in order to collect perceptions on different issues. These close-response questions were complemented by an open question asking respondents who had heard of the Council to describe it.

Regarding respondents' perception of science, we used three questions : (1) perception of the contribution of science ; (2) degree of interest in science and (3) perceived understanding of the scientific aspect of Covid-19 . Regarding attitudes to politics (H2), we also used three variables : (1)The Political orientation : we asked respondents to which political party they felt closest out of a comprehensive list of 17 parties, leaving the possibility for them to declare that they felt close to others or none. Answers were then recoded in 7 categories (far right, right, centre, left, far left, other, none), following standard practice in French political

science (see for instance the Political Trust Barometer – CEVIPOF) ; (2) The pPolitical engagement : we built a measure of overall engagement with politics drawing on three questions widely used in French research on the “practical dimensions of ordinary relations to politics” (Buton et al., 2016)□: “ Would you say you are interested in politics?”, “How often do you follow political news?” and “How often do you participate in elections?”. We dichotomized the answers to each of these questions and defined those with “high” engagement with politics as those whose engagement was high for all three of these aspects: those with “average” engagement, those whose engagement was high for two of these aspects and, those with “low” engagement as those whose engagement was high for only one or none of these aspects; and (3)The sSatisfaction towardswith government handling of the pandemic : we asked respondents whether they were satisfied with the government’s management of the epidemic.

Trust has been identified as a crucial factor in the perception of issues pertaining to science. We therefore included an indicator of “institutional trust” in public institutions. We asked respondents whether they had trust in a series of 13 institutions and actors (science, the media, the police...). Answers to each question were dichotomized, summed and the sample was divided in quartiles. Finally, we recoded variables to facilitate synthesis and analysis. Ages were grouped into three categories: < 35; > 35 and < 65; and > 65. Four-level variables were dichotomised (Yes/No; Agree/Disagree).

Statistical analysis

The construction of two logistic regressions on respondents’ knowledge of the Council and opinion on its usefulness followed a purposeful selection (Hosmer et al., 2013). Variables were retained at a threshold of $p=0.20$ for the univariate association, and then only kept if they contributed to the model (log-likelihood test between models). Each excluded variable was then tested to ensure that it did not contribute to the model. In the end, we kept only those variables that would best fit the model.

Data processing was done with Python (Scipy - Pandas – Statsmodel – PySHS).

Results.

Most French people have heard of the Covid-19 Scientific Council

The new Council quickly found its place in the landscape of bodies involved in the management of the pandemic. Approximately six months after its creation, three quarters of French people said they had heard of it (72.6%). This placed it at the same level as the National Authority for Health (HAS) and the High Council for Public Health (HCSP) both founded in 2004, or the National Agency for the Safety of Medicines and Health Products (ANSM), created in 1993, with respectively 77.1%, 72.4% and 69.7% of respondents saying they had heard of them. However, this was below the World Health Organization (WHO), whom 94% of respondents had heard about, but also *Santé Publique France* (SPF), the main Public Health agency in France (Figure 1). There was a very strong correlation between having heard of the Council and knowing about other actors in the public health system; only 5% of respondents in the quartile with the most knowledge of public health organisations did not know about the Council.

Figure 1. Familiarity with and trust in institutions.

Having heard of the Council does not mean having an opinion about it. Only one in five respondents (17.8%) had read at least part of one of the reports produced by the Council. In

addition to those who had never heard of the Council, 29.5% considered that they did not understand its role. Hence, less than half of the total sample formulated an opinion on its usefulness (41.0%). Slightly more than a quarter of all respondents had a positive opinion about the usefulness of the Council in managing the Covid-19 crisis (27.3%), and 13.6% had a negative opinion (Table 1).

Neither knowledge of the Council nor attitudes towards it were equally distributed among the respondents. The segment of the population that had heard about it and had an opinion appeared to be the more privileged members of society. Of those with a university degree, 41% said they have heard about it often (against 18% for those without), and 49% of high-income earners (against 17% of low-income earners). Conversely, almost three quarters of respondents with a monthly income of less than €1,000 (71.7%) said they either had not heard about it or did not understand its role. Those who said they had never heard of it were mostly young people under 35, the lowest income earners (less than 1000 euros), and blue-collar workers.

Table 1. Familiarity with and attitudes towards the Scientific Council

Setting the Council against a broader backdrop, our survey suggests perceptions of the Council connected two sectors contrasted the relative legitimacies of science and politics. The general context in France (Figure 2) was one of very high confidence in medicine and science (85% and 76% respectively), and very low trust in political and media institutions (36% for the government or National Assembly, and 23% for the media). Science-based decision making was seen as having particular importance but not being fully achieved: four out of five respondents believed that policy decisions should be based on scientific knowledge (81%, see Supplementary), but only one third of respondents believed that decisions regarding Covid-19 took sufficient account of scientific knowledge (31%).

The effect of attitudes to science and politics in perception of the Scientific Council

To jointly test the two hypotheses regarding scientific (H1) and political (H2) framing, we build models on two dimensions of perception. The first model focuses on whether respondents were aware of the existence of the Council. The second model, based only on respondents who have heard of it, focused on their judgement about the usefulness of the Council in crisis management. The finalized models took into account only those variables that have an influence, as described in the methodology.

In line with hypothesis H1, the perception of the Council appears to be related to respondents' attitude towards science. A positive interest in or attitude towards science is associated with a higher probability of finding the Council useful. Thus, 42.2% of respondents who considered the contributions of science to be positive also found the Council useful, compared to 15.7% of those who consider its contributions negative. This was also the case for reporting a good understanding of the scientific issues of the pandemic. While less than half of the respondents said they understood these aspects (47.3%), 40% of those who said they understood them considered the Council to be useful (Table 1).

Controlling for the different variables (Table 2), the respondents' general relationship to science comes into play, with those who say they do not understand the scientific aspects of Covid-19 were twice as likely to be unaware of the Council (0.50 [0.36-0.69]); those who had a positive view of the contribution of science were twice as likely to be aware (1.92 [1.32-2.79]). The expressed interest in science did not appear to have had any effect.

Table 2. Binomial logistic regressions on familiarity and perception of usefulness

Respondents who said they did not understand the science associated with the pandemic were only a third as likely to consider it useful (0.30 [0.21-0.45]).

In line with hypothesis H2, political engagement appears to differentiate respondents to a large extent. “Partisan proximity” comes into play, with only 18.9% of respondents from the political centre saying they did not know of the Council, compared to 42.6% from the far left. Respondents close to the government party were much more likely to find the Council useful, with 47% of those at the political center compared to 12% of those at the far right. This goes hand in hand with a strong correlation between satisfaction with government action and the perceived usefulness of the Council: 48% of those satisfied considered the Council to be useful, versus 16% of those not satisfied. Similarly, political engagement comes into play: 53% of those expressing a high level of political engagement had an opinion on the usefulness of the Council, compared to 28.9% for those with a low level of engagement (Table 1).

Controlling for the different variables (Table 2), political engagement continues to make a difference, with political engagement being associated with greater knowledge of the Council (1.71 [1.18-2.49]). A more partisan relationship, whether it is satisfaction with the government’s action or partisan proximity, does not, however, appear to affect awareness, except for respondents from the far-left (0.36 [0.18-0.72]).

On the other hand, satisfaction with the government’s handling of the epidemic had an association with the perceived usefulness of the Council. Respondents dissatisfied with the management of the crisis were only a third as likely to find the Council useful (0.31 [0.20-0.47]). This factor appears to strengthen the effect of proximity to parties to the left (2.05 [1.05-4.01]) and inversely to weaken the effect of proximity to parties to the far-right (0.48 [0.23-0.99])

Thus, the models indicated a joint effect of attitudes towards science and towards politics. However, the covariates involved in familiarity and usefulness are different. On the one hand, familiarity is largely associated with age, with older respondents being up to three times more likely to be familiar (2.78 [1.70-4.56] for the over 65s versus the under 35s). On the other hand, as regards the usefulness of the Council, general confidence in the actors involved in public life appears to be a central factor. Thus, the most trusting quartile is more than eight times more likely to consider the Council useful than those who are most distrustful (8.65 [4.50-16.65]). Finally, usefulness is not associated with socio-demographic covariates.

A diversity of position between advice and decision

Among the respondents who are aware of the Council, perceptions of what it is and what it does are far from homogeneous. While the vast majority agree that the role of the Council is to give advice to the government, with only 15% disagreeing (Figure 3), the forms that this relationship takes - or should take - divide the respondents. Only one third considered that the Council is independent of the government (39%) or of the pharmaceutical industry (36%), and less than half that it represented the opinion of the scientific community (44%).

In addition to this diversity of perceptions, we found that respondents had little practical knowledge of what the Council is and does. The open-ended question on the description of the Council allowed us to enrich the representations associated with it (Table 3).

Table 3 : Categories of answers recoded for the open question “describe the Council”.

Among those who described the Council, we can identify three main representations of the interface between politics and science, ranging from a purely political evaluation of the

Council to a combination of political and scientific aspects. Almost a third of the responses were judgements of the government's management of the health crisis, and they tended to be negative (21% of comments vs 5% of positive judgements). Interestingly, criticisms focused on the idea of a collusion between political representatives and the Council, and had a low opinion of its usefulness. Thus, some denied its "scientific" dimension, denounced its instrumentalisation by other interests. On the other hand, positive judgements validated the existence of such a body.

Those who provide a more detailed description perceived three kinds of relationship between science and politics. The most frequent (25%) characterized the Council as an advisory body and an aid to decision-making, clearly distinguishing between the information provided and the decision taken, while recognising the link between the two. Such perceptions ascribed a joint legitimacy between scientific expertise and the political process, similar to how the members of the Council described their role. But some descriptions emphasized either the informative function of the Council, as an autonomous producer of opinions or information summaries (13%), or an active function accomplished by taking decisions or directly carrying out actions (9%). This variation reflects an ambiguity in the notion of "guidance" or "advice". It is on this basis, that certain criticisms are levelled; as one respondent said, *"It is an assembly of scientists that gives an unchallenged opinion and orders the course of action to be taken in the fight against the virus. Obviously, their diagnosis is questionable."*

Discussion and conclusion

As underlined above (Weingart et al., 2022), the Covid-19 pandemic has provided an extraordinary test case for an analysis of the interrelations between policymakers, scientific experts and the public. Recent work on expertise during the pandemic has shed light on how much political decision-makers have followed evidence (Rubin et al., 2021; Vickery et al., 2022), how expertise has been organised, and the experience of experts (Bergeron et al., 2020; Colman et al., 2021), including critiques of the practical conditions in which evidence-based policymaking was conducted during this epidemic (Greenhalgh and Engebretsen, 2022). We have focused on the less explored question of how the public perceives these new scientific advice bodies and their relationship with political decision-makers.

Who is aware of the existence of a novel scientific advisory body?

Our survey shows that the public "staging" of science-based political decision-making is only likely to have a direct effect on a certain segment of the public. As observed by different researchers working on perception of regulatory science, government agencies are rarely known (Eyal, 2019). As in many other countries, regulatory science gained exceptional visibility in France during the pandemic. But we found that a quarter of French people had never heard of the Council despite its prominence in the general news media throughout 2020, while another third had heard of it but either did not understand its role or were unable to formulate a judgement on its usefulness. While the Council managed in a very short period of time to achieve a level of awareness comparable to that of much older public health institutions, this finding illustrates the limited reach of this type of actor's communications to the general public.

The Council's prominence in the media enabled it to reach the social groups most interested in political and scientific news, with the greatest knowledge of institutions, the highest levels of education, and the greatest willingness to trust institutions. The usefulness of a scientific advice body such as the Council is therefore accepted mostly by a public already committed

to delegation to the government of the management of public life. Missing is the audience that one might imagine would be the main target of efforts to associate health recommendations with the authority of science, i.e. the groups most distrustful of state policies and institutions. Also in play are social tensions that go far beyond Covid-19 and even beyond health issues. Political sociology studies have shown the existence of a major divide between, on the one hand, people who have at least some interest in public debates (and politics in particular), and on the other, a large part of the population that is almost completely disconnected from these public debates and has a rather complicated relationship with the state and its institutions (Buton et al., 2016; Spire, 2020). In this respect, legitimisation of public health recommendations and decisions by scientific advice bodies such as the Council is limited by the nature of their relationship with the public. They seemed to be mainly brought to the attention of the public via media which only reach a particular audience, with a lesser exposition on social media even if some debates and polemics happened for instance on platforms such as Twitter. It calls for more analysis on the relationship between traditional media and the diversity of social media which appeared to play an important central role in the pandemic.

Scientific authority and political authority: intertwined but distinct

The pandemic has made visible the interdependencies between politics, health and economics, with practical consequences for people's attitudes (Hilgartner et al., 2021). These interdependencies are reflected at the public level in studies that show the strong influence of political identities on a wide range of responses to the pandemic (Shepherd et al., 2020). However, they have tended to focus mainly on the United States due to its long history of politicisation of scientific issues and increased political polarisation over the past decade (Funk et al., 2020; Gauchat and Andrews, 2018)□.

Our case study in France shows that even in a context where general trust in science is less politicised (Funk et al., 2020)□ attitudes towards a specific body such as the Council are still affected by tensions related to the coexistence of two forms of legitimacy: the scientific and the political. The government strategy of creating, publicising and regularly mentioning this body in the name of "following the science" has by definition associated the Council with the political process, making it difficult to clearly separate science and politics. It is therefore not surprising that the Council was the target of numerous attacks for its lack of autonomy or suspected conflicts of interest with "Big Pharma".

We show that public perceptions of the Council are influenced by respondents' relationship with politics. Firstly, respondents' level of political engagement – measured via a set of characteristics including interest in politics and voting frequency – is strongly correlated with awareness of the Council. Secondly, judgments on the Council's usefulness depend strongly upon attitudes towards the government, even though the government did not systematically follow the Council's advice. However, it is important to note that, while partisan proximity seemed to be an important explanatory factor in descriptive statistics, it did not remain strongly significant in multivariate analyses. These perceptions are therefore not politicised in the traditional sense associated with "partisan competition ("politics") but in a broader sense associated with attitudes towards public debates, institutions and policies ("polity"). This contrasts strongly with other Covid-related issues where partisan identities have been found to affect strongly the French public's perception, such as vaccines (Ward et al., 2020)□ and treatment with hydroxychloroquine (Schultz et al., 2022). It also contrasts with the hyper-polarised situation of attitudes to experts described in some countries such as the USA (Evans and Hargittai, 2020). These findings likely reflect the fact that when opposition parties

criticized the government, they seldom explicitly mentioned the Council. To better understand the determinants of attitudes towards the council and expertise on Covid-19 more broadly, it would be necessary to combine survey data with a systematic analysis of political parties' positions and their media coverage. This brings us to our next point.

Public opinion associated with scientific advice revealed a paradoxical combination of both recognition of an interdependence between science and politics on the one hand, and on the other hand the valorisation of a fairly widely shared model separating science from political decisions (Pielke, 2007). Indeed, during this period, the Council's advice was sometimes accepted by the government, sometimes ignored, and its use in the political process evolved over time. We found that several public conceptions of the role of scientific advice coexist, and are potentially contradictory, ranging from direct involvement in the crafting of policies to production of information external to processes of political management. This suggests the importance of studying how different social groups think about the interdependencies between science and policy, and navigate this complexity (Gauchat and Andrews, 2018).

Where does the public draw the line between acceptable or beneficial relationships and undue/unacceptable influence? To better understand these differences in perceptions as well as their determinants, it would be necessary to analyse systematically the way in which the news media covered the Council's work and its relationship with the government. While we did not perform such a systematic analysis, we followed these debates closely. We noticed that criticism of the lack of independence of the Council or, conversely, of the excessive influence of scientists in decision-making regularly surfaced in the mainstream news. Also, when covering the Council's work, France's main newspapers often framed the issue in terms of "who controls whom". We also observed a shift in this media coverage, with journalists focusing more and more on divergences between the government's actions and the recommendations of the council. This trend emerged progressively in the weeks before our survey and was particularly stark in the months after.

This survey constitutes a first exploration of public attitudes towards scientific advisory bodies, drawing on the particular case of the French Covid-19 Scientific Council. While we believe our findings are of interest in themselves, we are also conscious that their full implications will only appear when compared to similar studies conducted at different moments in the Covid-19 epidemic, studies conducted in other countries, as well as analyses of public controversies surrounding these advisory bodies that have emerged in France and elsewhere.

Conclusion : toward a better understanding of the public perception of regulatory science

In this article, we have explored public perceptions of a particular scientific bodies, composed of researchers but integrated into public decision-making processes. Focusing on such bodies allows us to reflect more deeply on the place of science in society. Debates on science in society generally focus on either disciplinary research or technological innovation, and little on the links between science and policy, and these numerous regulatory science entities are generally "outside public perception and debate" as (Weingart et al., 2022) point out. Because they contribute to the functioning of the state (Jasanoff, 1998; Lamy, 2017) by providing information, data, and scientific observations to political decision-makers, they are often confused with administrative apparatuses, or even with political interventions in health. The creation of a new entity such as the Scientific Council has therefore made widely visible certain crucial issues such as the legitimacy of scientific advice to political decision making,

the institutional architecture of health decision-making, and the existence of competition between different sources of expertise. Whether on the part of the French government or its representatives, the legitimacy invoked was above all that of academic science, which is based in particular on institutional autonomy. This contrasts with the nature and functioning of a scientific advisory body such as the Scientific Council which was deeply entangled with the urgency of managing the epidemic and had a very direct connection to top political decision-makers. As was pointed out by (Eyal, 2019), research on public attitudes to science tends to lump all forms of science and expertise together without paying enough attention to the distinction between regulatory science and that which is carried out in academic institutions (see also (Lamy, 2019)). As we can see in the case of France's Covid-19 Scientific Council, trust in science and scientists is far from being the only issue when it comes to public perceptions of scientific advice.

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Figure texts

Figure 1. Respondents’ familiarity in research organizations and health agencies.

Acronyms : WHO : World Health Organization ; CNRS : National Research Center ; ARS : Regional Health Agency ; SPF : Public Health Agency ; INSERM : National Biomedical Research Center ; DGS : Health Ministry administration ; HAS : Health Agency ; HCSP : Public Health Council ; ANSM : National Drug Safety

Agency ; IHU : Institut of infectiology in Marseille RO: Reseach Organization ; HA : Health agency ; M : Ministry administration

Figure 2. Institutional Trust.

Figure 3. Respondents' attitudes towards the French Covid-19 Scientific Council.

Table 1. Familiarity with and perception of the French Covid-19 Scientific Council.

(chi2 test for statistical significance * : $p < 0.05$ ** : $p < 0.01$ *** : $p < 0.001$) ; the total of the row is 100%)

Table 2. Attitude towards the Covid-19 Scientific Council.

(p-value chi2 ; the total of the row is 100%)

Table 3. Categories of answers recoded for the open question "Describe the Covid-19 Scientific Council".

Table Supplementary 1. Binomial logistic regression on familiarity and perception of usefulness of the Covid-19 Scientific Council. Independent variable at the threshold of $p = 0.2$ were kept in the model.

(Acronyms : OR : Odd Ratio ; CI : Confidence Interval ; p : p-value ; DK : Don't know ; HS : High School)