

4 The trustworthiness and reliability of science information channels and sources in the public's view

*Giuseppe Pellegrini, João Estevens,
Aneta Krzewińska, Isabel Mendoza and
Peter Guran*

Introduction

Understanding perceptions of trust in or distrust of information sources is essential in the post-truth era. Current society has created a new communication environment that allows for dissimilar ways of developing (dis)trust and accountability mechanisms, especially considering how subjective this process can be. Indeed, the concept of trust is linked to the subjectivity, intersubjectivity and objectivity expressed by individuals when interacting with others, as in the case of the public consultations carried out in the framework of the CONCISE project. Trust and reliability are relevant for the study of science communication because they influence people's perceptions of scientific developments and reinforce science-related decisions. Trust in science is a constant even in the fake news era and despite the barrage of disinformation via the now omnipresent social networks (Blackburn, 2005).

In the study of trust in the public communication of science, it is vital to consider the integrity of scientific experts who tend to wield considerable influence in the traditional media (Reif, Kneisel, Schäfer, & Taddicken, 2020; Rabinovich & Morton, 2012). At the same time, trust in public institutions plays a key role. In risk communication, for example, when citizens receive information from public institutions, they assess it on the basis of what is proposed (Weingart & Guenther, 2016; Chryssochoidis, Strada, & Krystallis, 2009).

Trust in information sources, institutions and experts

When conceptualising the level of trust in the public communication of science, it is important not to overlook sources such as friends, family and relatives, who often play an essential role in influencing views on scientific issues, especially those relating to health (Larson et al., 2018). In the case of climate change, moreover, some researchers have paid particular attention to parental circles in the quest for information (Leiserowitz et al., 2013).

The most recent European Eurobarometer survey on citizens' opinions and science focused on the level of trust in the institutions governing science (Eurobarometer, 2021). Half of the respondents (from 18 different countries) agreed that there was no other option but to trust those managing science and technology, this being especially the case in Hungary (68%), Bulgaria (66%) and Poland (65%). In the same vein, there were two different levels of trust in the countries participating in the CONCISE project: Poland (65%), Italy (63%), Spain (62%) and Slovakia (61%) with a high level, and Portugal (52%) with an average level.¹

In the same survey, the respondents' opinions on scientists were also sounded out. Expressing mixed views about the credibility of scientists, half of the respondents (50%) agreed that 'we can no longer trust scientists to tell the truth about controversial scientific and technological issues, because they depend more and more on money from industry', while 21 per cent disagreed. However, the proportion of respondents agreeing had fallen by 8 per cent since 2010, while the proportion of those disagreeing had increased by 5 per cent. With respect to the citizens participating in the CONCISE public consultations, the Spaniards were the most sceptical about the trustworthiness of scientists (57%), followed by the Portuguese (53%), whereas the Italians (49%), Poles (47%) and Slovaks (46%) were less distrustful.

Health and environmental issues spawn many public controversies, calling scientific authority and competence into question. As a matter of fact, trust is not unconditionally placed in experts and science but varies depending on many factors (Scarfuto, 2020): the science topics in question, gender and culture, scientific literacy, scientific news exposure and political values and contexts. According to Wynne (2007), it can be contended that there are multiple factors that make citizens distrust science and technology. These point to the need for generating a different kind of independent, collective meaning-making and knowledge rooted in social conditions, visions and priorities differing from those of the scientific elites.

So, understanding above all how trust is generated appears to be essential. In the opinion of Boswell (2021), trust is a form of inference based on familiarity or previous experience. We learn to trust people because we know from experience that they will behave in predictable ways, thus putting our mind at rest. In large and complex societies, this confidence cannot be merely grounded in our direct experience of the behaviour of other individuals. We also need to trust familiar social 'archetypes', relying on representative characteristics, such as people with a background similar to ours, who support the same political party or who live in our neighbourhood. Alternatively, and this is especially relevant in emergency contexts, like, for example, the COVID-19 pandemic, we may learn to trust people with specific training or professions, such as doctors and nurses.

Be that as it may, people's trust in experts can diminish when they publicly express different and even conflicting opinions. This is the case of the COVID-19 pandemic in the period between March and October 2020, when many epidemiologists, virologists and doctors offered their prognoses in different media. This public overexposure of very different expert opinions perplexed the public in general and made them criticise the communication skills of these important actors (Bucchi & Saracino, 2020).

Trust in science: a framework for the analysis of public opinion

Given the complexity of studying trust in science, communication research needs to treat it as a multilevel problem. Individual perceptions of science are embedded and shaped by the social dynamics of intersubjective, subjective and objective relationships. To study the views on climate change, vaccines, GMOs and CAM expressed by the citizens taking part in the discussion groups, a particular content analysis method was employed.

Specifically, the citizens' views were analysed considering how trust was built on the basis of the following:

- *Subjectivity* is the self-conscious perception of people or subjects in their interaction with others, as in a public consultation group. Participants in public consultations display subjectivity when they staunchly defend their stances on issues open to many interpretations. Subjectivity defines interpretations, points of view and worldviews. As the citizens participating in the public consultations expressed their opinions and talked about their personal experiences, offering examples from their own lives, theirs was a subjective view of reality. Given that their experiences were unique, it was possible to gather a large amount of material containing many colourful descriptions of specific situations. This subjective perspective provides an opportunity to analyse the material focusing on the individual level by treating all the participants as unique people in terms of their experiences, thoughts and opinions on climate change, vaccines, CAM and GMOs. And while during the analysis of the material gathered, an effort was made to identify certain patterns (similar views and behaviours), it should be recalled that these patterns were illustrated each time with examples from individual subjective experiences.
- *Intersubjectivity*. Each thought community shares social experiences that are different from those of others, which, in turn, gives rise to different beliefs. The fact that these experiences transcend subjectivity explains why an entire thought community can share them. From this perspective, intersubjectivity implies that individual beliefs are often the result of those of a thought community and not just of personal experiences or universal and objective human beliefs. Beliefs are reshaped following standards set by thought communities. The people forming a given thought community share certain ways of thinking about the world around them, which gives rise to shared beliefs about reality, as well as desirable behavioural patterns, resulting in similar actions being taken. To understand how opinions are formed within a given society, it is not enough to aggregate the personal views of individuals. For it is necessary to consider what is created by groups of like-minded people constructing their identities and ideas about the surrounding world and also taking specific actions. As regards trust building, an enquiry was made not only into what was said when the participants recounted their personal experiences but also into whether the views that they expressed had been developed within their own community. In other words, the different levels of trust in individual people, institutions, organisations and the media

reflected those of the members of the community to which the respondents belonged. This clearly shows that although the participants in the consultations shared the same reality, they sometimes experienced it in a different way, which they then shared with other members of their thought community.

- *Objectivity* is an attitude characterised by having an open mind to evidence and its consequences. An objective position is free of personal biases and frequently associated with scientific evidence. As to the four topics discussed during the public consultations, this was expressed by the idea that scientific claims, methods and results are not, or should not be, influenced by individual perspectives, value judgements, community bias or personal interests. During the public consultations, the participants were objective when they cited the statements of scientists or scientific research results or provided examples of scientific studies (books, articles, conferences papers). This was also the case when they talked about the scientific procedure and stressed the need for systematic research and the scientific verification of the results obtained. That objectivity was guaranteed by the independence of the researchers and research institutes involved and by transparent research funding.

Brief note: the CONCISE project consisted of five public consultations involving citizens from Italy, Poland, Portugal, Slovakia and Spain, in which a wide range of opinions on the public communication of science were gathered. The results of the analysis described in this chapter are based on the transcripts of the recordings of the discussion sessions, considering three main dimensions:

- *Authority*. Concerning the role of actors, like, for instance, experts, decision makers and communicators, in the discourse of power and their exercise of authority (Brossard & Nisbet, 2007). This is reflected in the quality of information sources (e.g. competent scientific evidence, authoritative data, referenced information, technical jargon and factual information).
- *Credibility*. Understood as the accuracy of the messages conveyed, an objective scientific writing style and informative scientific data (Bucchi, 2013) (e.g. language, explanations, completeness, independence and depth). Therefore, those texts relating to the public communication of science that employ non-scientific expressions and styles are often regarded as lacking in legitimacy and credibility (Myers, 2003).
- *Legitimacy*. Relating to the relevance of information for individual needs (e.g. health and environmental concerns), the actors who are considered as being the most relevant on the public stage and the citizenry's relationship with a given topic. This also implies that 'decisions made in political institutions are morally acceptable or justifiable in terms of democratic values' (Peter, 2017).

Data analysis and discussion

After performing a data analysis using the four aforementioned dimensions as a reading filter, the time has now come to determine how the citizens expressed their

level of trust in or mistrust of the topics discussed, highlighting similarities and differences between the five countries. This allows for identifying the driver of trust in science information channels and their level of reliability, according to the citizens participating in the discussions. The quotations were chosen following the criteria of nationality and topic – climate change (CC), CAM, GMOs and vaccines (VAX) – gender, age and educational level.

Authority

The main sources of authority were generally public institutions and scientists, albeit varying slightly depending on the topic and country. Authoritativeness was acknowledged when there was a certain degree of coherence between the information channels and sources that could be consulted to verify science news.

For delving deeper into the topic, I usually visit the National Health Directorate website, because I believe it's credible.

(Portugal, VAX, male, 55–64, university ed.)

I think there should be a kind of ministry or global, European or national organisation [...] with official authority and that's in charge of supervising and regulating companies and also of informing; I think it should act like a bridge between companies and experts and scientists and citizens ...

(Spain, GMOs, female, 18–24, secondary ed.)

Regarding the climate change topic, most of the participants claimed that they obtained information from communicators, especially journalists, who were considered to be authorities on the subject. Experts and opinion leaders were the second most important source of information. But in some countries, like, for example, in Slovakia, there were not apparently any acknowledged experts in climate change.

I obtain information on climate change from journalists and I trust relevant media. I don't know any personalities or experts who address this topic in Slovakia.

(Slovakia, CC, male, 55–64, secondary ed.)

The citizens most frequently obtained information from digital media, while they considered that social networks were the communication channels through which false information was disseminated most often. Especially in the case of the health topics discussed (vaccines and CAM), they believed that social networks were not trustworthy sources. It warrants noting, however, that it was those citizens more doubtful about the benefits of vaccines and CAM who preferred to use the Internet as an information source in this regard. Even though they tended to resort to digital information sources, the traditional media were the most credible in their eyes.

When I read something on a website, I often get pissed off because it's fake news.

(Italy, CAM, female, 55–64, secondary ed.)

A lot of information in the media's distorted, so I only trust factual information and scientific research.

(Slovakia, CC, male, 18–24, secondary ed.)

In sum, for the citizens, it was necessary to resort to official and institutional sources in order to find authoritative information. Thanks to these sources and by overcoming the preconceptions and subjective beliefs that can often be formed in the family circle, they were able to distinguish what was important and trustworthy from what was not.

Credibility

The credibility of scientific messages is primarily related to the scientific language in which they are formulated but also to the completeness of the data, the objective tone of the statements, the accuracy of the explanations that they contain and the independence of their authors. Interestingly, the factors influencing the assessment of the credibility of specific statements depend primarily on the author of the text in question.

In the discussions on climate change, there were very frequent references to scientists researching on the topic who were credible information sources for the citizens participating in the public consultations (e.g. Antonio Turiel in Spain). For them, the credibility of scientists and researchers was guaranteed by a long track record working in international teams and publishing research results based on empirical data. It should be noted that the Intergovernmental Panel on Climate Change (IPCC) was considered to be a credible organisation in Italy and Portugal.

[...] the IPCC, where however there's an international group of academics who'll hopefully compare their research and seek to offer a coherent and complete vision.

(Italy, CC, male, 35–44, university ed.)

Credible information was mainly that containing or relying on scientific data and which also indicated the source, including websites, TV stations and social media.

Information without a source is simply rubbish.

(Poland, CC, female, 35–44, secondary ed.)

I trust official media outlets like Deutsche Welle or the BBC.

(Slovakia, CC, female, 35–44, secondary ed.)

The citizens rejected channels in which other messages prevailed over the scientific kind as unreliable, showing themselves to be particularly critical of those focusing exclusively on economic and communication aspects.

When a website has loads of adverts, I don't give it any credibility; it's a website that's only there for advertising.

(Portugal, CC, male, 25–34, university ed.)

The citizens in the public consultations singled out three main sources of credibility relating to the vaccine topic. They referred to the knowledge accumulated and published by scientists, although they admitted having difficulties in understanding the results of such studies precisely because of the scientific jargon employed.

[...] when it comes to obtaining information in general, on various subjects, you know that scientific papers, scientific journals, are the most reliable information source. But it's difficult.

(Poland, VAX, male, 18–24, secondary ed.)

Institutions involved in regulating vaccines, such as the World Health Organisation (WHO) and national ministries of health, were also seen as credible sources.

I think the WHO has reliable sources.

(Slovakia, VAX, male, 55–64, secondary ed.)

Finally, for the citizens, the most accessible and reliable source of information on vaccines were general practitioners.

I trust doctors! Doctors as conveyers of science.

(Portugal, VAX, male, 35–44, university ed.)

As to CAM, there were several factors that guaranteed the credibility of messages. Firstly, the citizens treated information on CAM as credible when they had tangible evidence that certain treatments were effective.

The information's credible if the alternative options are provided, e.g. has such a method been used before? How was it used? Was it helpful? Is it something new or did it exist before? [...] I feel I'm being treated seriously if I'm provided with options to choose from.

(Poland, CAM, female, 35–44, university ed.)

Secondly, credibility could be provided externally, namely, by some or other independent, conventional medical expert confirming the efficacy of the procedure in question, thus making the information trustworthy for its recipients. As in the case of vaccines, such external experts included conventional doctors offering alternative treatments to patients. In other words, for the citizens, it was important that traditional medicine lent credibility to CAM.

I trust an alternative method of treatment only when it's been clinically tested and endorsed by doctors.

(Slovakia, CAM, 55–64, female, secondary ed.)

Thirdly, it was those aspects that gave credibility to traditional medical treatments that also made their CAM counterparts seem more trustworthy, including, first and foremost, degrees and certified training courses given by CAM practitioners.

One of the problems is credibility. Not because of scientists, doctors, but because of the technician, whoever does it. Because there's, of course, a ... falsehood in these kinds of things. How do you dignify these issues? [...] There're now training courses, there're degrees. They give some credibility to the topic.

(Portugal, CAM, male, 45–54, secondary ed.)

Interestingly, in the discussions on GMOs, there were references to both the credibility and lack of credibility of sources. Messages from political parties, social media posts and any kind of communication that presented the arguments of only one side were considered as unreliable.

It can't be on Facebook where somebody says this or that. That has zero credibility.

(Portugal, GMOs, male, 45–54, secondary ed.)

As with the other three topics, the messages about GMOs transmitted by the scientific community were considered to be reliable. In addition, the 'GMO-FREE' information available to consumers on food packaging was appreciated.

I consult information on GMOs and modified food, but also accurate information on labels. Specifically, on food, on food products, so everyone can choose.

(Poland, GMOs, female, 55–64, university ed.)

GM foods should be labelled.

(Slovakia, male, 25–34, university ed.)

Legitimacy

The legitimacy of the actors involved in the dissemination of science information on these topics tended to derive from the recognition of health or environmental concerns. The citizens participating in the public consultations often associated these concerns with political institutions. At a national level, governments were highlighted as they needed to pass laws and regulations that took into consideration the common good. It was observed that the citizens understood these institutions as having the legitimacy to make choices and to design policies. This was clearer in the vaccine discussions, insofar as national vaccination plans and other policies rely on relevant scientific evidence in this respect.

I trust that the Ministry of Health will include the relevant vaccines in the national vaccination plan.

(Portugal, VAX, female, 65–74, secondary ed.)

The government approved a law on the protection of public health ...
(Slovakia, VAX, female, 55–64, secondary ed.)

At a transnational level, the citizens highlighted the role of the European Union, as one of the Poles stressed.

[...] there're also European information sources. They're also useful because they're close to the European Commission [...] when the bodies working on a given issue do it in a reliable way, they do it in international circles, so it's good, because it gives us an overview of everything, of different approaches [...] to a given issue, of all the member states or associated countries.
(Poland, GMOs, female, 35–44, university ed.)

One of the Portuguese citizens compared different legal systems, before offering a positive assessment of the European Union. When comparing EU and Chinese legislation, she emphasised the institutional context made a difference, with the EU institutions following a set of procedures that ensured that the production and sale of products were governed by more restrictive regulations. She was of the opinion that this restrictive approach derived from the desire to protect consumers and the citizenry. Thus, in a way, there was a social motivation that surpassed the economic one.

I trust the legislator. I trust that if a product is to enter the European space it needs to abide by a set of rules. I trust institutions [...] even if that product comes from China ... well, not everything coming from China is bad ...
(Portugal, GMOs, female, 55–64, university ed.)

Similarly, one of the Slovak citizens, who worked in the automotive sector which was being restructured at the time, underscored the European Union's firm commitment to environmental issues. (As is common knowledge, the European Union aims to become the first climate-neutral continent by 2050.)

Before my maternity leave, I worked in the automotive industry. I came across the European legislative measures pushing for the reduction of emissions ...
(Slovakia, CC, female, 35–44, university ed.)

Although a positive assessment of the role played by the European Union prevailed, there were also several citizens who had their doubts about its legitimacy to introduce regulations of this sort – instead of national parliaments – which implied that, in their eyes, it did not have the same legitimacy as national political institutions in certain areas.

In my opinion, these are such serious issues that they should be left to national parliaments or referendums in individual states. They shouldn't be decided on at an EU level.
(Slovakia, GMOs, male, 45–54, secondary ed.)

At an individual level, the most cited person was Greta Thunberg, although there were differences of opinion, with some citizens doubting her motivations and others valuing the way in which she raised awareness on this topic with a great deal of energy and charisma. There is also a generational issue concerning Thunberg, as she belongs to Gen Z whose members employ digital tools to identify and decry abuses without any moral, economic or social constraints. Hence, the provocations of people like Thunberg prompted others to reflect on the contradictions and limits of unsustainable development. That seems to have been the opinion of one of the Italian citizens.

[...] Greta has the great merit of having addressed things from a different angle that's also rather forceful [...] those of us who aren't so young tend to be bored by certain issues. While young people, either because of their age, [...] want to go on strike all the time! However, they have a greater sensitivity towards major issues, which in older people doesn't tend to be so strong.

(Italy, CC, male, 45–54, secondary ed.)

Furthermore, another important point relating to CAM was stressed. The absence of a formal legal framework regulating it meant that the citizens were not so sure who were the legitimate actors in this field. This institutional ambiguity led them to base their opinions on personal experience – either their own or that of friends and family. In other words, the many informal information sources made it unclear which were the most reliable in this respect.

That has to be the people, since it's an area on which there's been no legislation. It has to be the people who search for information from what seem to be the most reliable sources. Then, information coming from different sources should be contrasted. If there's no [official] information available, it's almost down to trial and error.

(Portugal, CAM, female, 55–64, secondary ed.)

Differences and similarities between countries

As posited in the methodological framework section, the comparison between the data collected in the framework of the CONCISE project allows for glimpsing the differences and similarities between trust mechanisms in the five countries taking part.

In particular, the analysis of specific dimensions is especially useful for identifying the differences and similarities between the views of the citizens from the different countries, filtered according to the categories of authority, credibility and legitimacy. These dimensions refer to the type of topic covered, the level of subjectivity, intersubjectivity and objectivity present and the motivations expressed during the discussion sessions.

Analysing the category of authoritativeness, it is possible to observe significant differences between the topics covered. Trust in health issues was firmly underpinned by subjective and intersubjective mechanisms that permitted the citizens to

identify doctors, above all, as the most reliable people for discussing the issue of vaccines and CAM. The data analysis reveals that the Italian and Portuguese citizens were more willing to place their trust in public institutions.

As to climate change, it is interesting to note that the citizens went to greater lengths to search for objective information, for which reason they were more likely to trust experts and official channels. In other words, they tended to prefer objective information, recognising that personal experience and the lessons that could be learned from it were insufficient for building trust. The analysis also revealed a certain level of scepticism towards the media among the Italian, Portuguese and Spanish citizens, which demonstrates that communication channels often do not provide complete or acceptable information.

As regards GMOs, the citizens believed that there was a need for institutional information based on scientific evidence. When broaching this topic in the discussion sessions, the Poles were more critical towards public institutions.

Moving on to credibility, on the subject of climate change and GMOs, the citizens trusted, by and large, institutional sources and public actors like scientists and scientific experts. In this regard, there was a much clearer confluence between objective, subjective and intersubjective considerations.

The credibility factor was clearly expressed, in various ways, in the discussion sessions on GMOs: the neutrality of science (the Italians and Poles), a particular distrust of politicians (the Portuguese) and the recognition that a lack of information in this respect led to high levels of distrust (the Slovaks), among other aspects. Lastly, a number of citizens also stressed the fact that some very popular online sources, such as blogs and YouTube channels, were unreliable (the Spaniards).

Regarding vaccines, there was a consensus on the need for trained experts and reliable sources, especially among the Italian, Polish and Portuguese citizens, with the accent being placed on specific training, scientific certainty and institutional assurances. In a more nuanced fashion, their Slovak and Spanish counterparts were of the mind that it was important to exclude economic stakeholders and ideology from the discussion.

In the case of CAM, the citizens were generally receptive to non-conventional practices, especially in the case of chronic medical conditions. While the Poles and Slovaks also called for evidence of their effectiveness and the same kind of information available on conventional treatments to place greater trust in CAM.

The data analysis relating to the legitimacy category reveals that, in the main, the citizens tended to prefer what they believed were trustworthy sources, channels and institutions over others. This finding evinces the rather colourful framework of public communication in which it is necessary to move in order to obtain information deemed valid.

With regard to vaccines, two positions stood out. On the one hand, the Italians and Poles emphasised the legitimacy of doctors because of their close relationship with the citizenry and the possibility of obtaining immediate answers from them. On the other, the Slovaks, Spaniards and Portuguese referred to national and international public authorities as guarantors of public health standards.

In relation to climate change, it is interesting to note the citizens' acceptance of some current actors, including Thunberg and Al Gore, from whom they believed that they could obtain useful and, therefore, trustworthy information, this being especially the case in the Italian and Portuguese discussion groups.

In contrast, the Spanish and Slovak citizens tended to place greater trust in the media providing information on the subject, as long as this was used critically, given the different interests that could undermine the accuracy and reliability of the news. The institutional aspect, associated with trust in state regulations, was underscored by the Spaniards.

As to GMOs, there was a consensus among the citizens from all the countries involved on the need for clear guarantees at a supranational level. That was why legitimacy was invoked, particularly the European Union's ability to legislate on complex and controversial issues, like GMOs. Likewise, in this case, institutional sources served as a sort of compass guiding citizens when judging what information they should trust. It can be claimed that the guarantees offered by individual states are not effective enough for managing such issues with a potentially huge impact. Therefore, their legitimacy is insufficient for building high levels of trust.

Conclusion

The analysis of the transcripts of the discussion sessions, recorded during the public consultations held in the framework of the CONCISE project, allowed us to study public opinion. Despite the digital revolution and the advent of social networks, traditional communication channels (the press, radio and television) continue to be important information sources with the ability to build trust among the citizenry.

For the citizens participating in the public consultations, official and governmental sources were the most authoritative, followed by experts, who in general were seen as trustworthy because private interests were not at stake. This stance was very strong in the discussions on climate change and GMOs, in which those taking part recognised that the citizenry did not generally have the knowledge or ability to bring about the desired changes.

On the contrary, for health issues and particularly CAM subjectivity played a more important role in building trust, although the preferred experts were mainly doctors.

The citizens from the five countries used information sources and channels differently to build their trust in science. While the Slovaks called for more institutional information, the Italians, Spaniards and Portuguese placed greater trust in institutional sources.

In light of the results of the data analysis, however, the greatest differences in terms of authority, credibility and legitimacy were mainly due to the different views expressed in the discussion sessions. In relation to health and environmental issues, these also differed depending on the citizens' country of origin, with the Poles and Slovaks calling for more guarantees as regards health issues, especially in the case of vaccines. As to environmental issues, in particular climate change, the Italian and Portuguese citizens tended to place their trust more in non-expert

actors and less traditional communication channels, whereas the Spaniards and Slovaks held that there was a greater need for proven institutional information.

Understanding how citizens build their trust in science, on the basis of the four topics addressed in the discussion sessions, requires a careful analysis of the image that they have of institutions and scientists. Their ability to shift between institutional and non-institutional information sources and channels emerged in its full complexity, thanks to the research performed in the framework of the CONCISE project. These results show how complex the information paths of citizens are and how diverse and plural the media available to them are. While acknowledging that the most credible actors (experts and scientists) are still generally trusted, new actors have emerged. To this should be added that citizens are currently demanding a more active role in communication processes.

Note

1 Percentage of ‘Strongly agree’ and ‘Agree’ as answers to the item, ‘We have no other option but to trust those governing science and technology’.

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