Rathenau Instituut

Trust in science in the Netherlands (2021 survey)

Report

Abstract

Every three years, the Rathenau Instituut surveys the current state of public trust in science in the Netherlands. Some of the survey questions are the same each time, so that we can make comparisons over time. Some of the questions are also new ones, however, allowing us to choose a different focus that reflects current events. In the survey conducted in spring 2021, we focused on the Covid-19 pandemic and examined its impact on public trust in science. The pandemic has given people a glimpse behind the scenes of science. They saw that scientists do not always agree and, for example, that they debated the effectiveness of face masks and the role of aerosols. But they also saw how researchers quickly developed vaccines against the coronavirus and that Covid-19 treatments improved as the weeks and months passed.

Based on our survey, we have reached the following main conclusions.

Public trust in science in the Netherlands has increased.
On average, public trust in science in the Netherlands rose from 7.07 in 2018 to 7.42 in 2021. The increase was not limited to science but also extended to other institutions covered in our survey. The rise in public trust is likely to be related to the pandemic. Forty per cent of the Dutch population believe that the pandemic has influenced their trust in science. Almost a quarter (24%) say they trust science more now, mainly because of the rapid development of Covid-19 vaccines. Sixteen per cent say that they trust science less now, however; they too cite the rapid development of vaccines as a reason, saying that they worry about their reliability. They also struggle with contradictory information or lack of clarity. More than half of the respondents (56%) say that their level of trust has remained the same, the main reasons being that they already trusted science and that scientists are ‘just doing their job’.

Voting behaviour is related to trust in science and other institutions in general.
We see significantly more trust or less trust in science among people who vote for certain political parties. GroenLinks voters, for example, give their trust in science an average score of 8.4 and trust science significantly more than non-GroenLinks voters. People who vote for the Partij voor de Vrijheid (PVV) rate their trust in science at an average of 6.5, and trust it significantly less than voters of other parties. The significance of these scores is not limited to trust in science, however. A low score on trust in science is associated with trust in institutions in general. Our survey shows that GroenLinks voters also have more faith in the judiciary and the Dutch Government. Respondents who vote for the PVV, on the other hand, place less trust in them.

These results correspond to earlier research by Statistics Netherlands showing that voting behaviour is related to trust (in institutions) in general. People who have little trust in institutions are more likely to vote for the PVV, while voters who have a high level of trust are more likely to vote for GroenLinks.

People trust the coronavirus information provided by physicians, scientists and the National Institute for Public Health and the Environment (RIVM).
People place the most trust in coronavirus information that comes from physicians working in hospitals, with 89% of the respondents stating that they had a fair amount or a lot of trust in them. Next in line at 82% are scientists working at universities. These results are consistent with surveys conducted in other countries: people generally trust coronavirus information most when it comes from physicians, closely followed by scientists. Seventy per cent of the Dutch also trust the Covid-19 information issued by the RIVM. The results show that the majority of the respondents (65%) consider the RIVM to be part of the science sector, a factor that may contribute to trust.

The Dutch want to receive all available information on Covid-19, but they find contradictory information confusing.
Most people think that the media should share all available information about Covid-19, even if it is contradictory. At the same time, most people find it confusing when scientists disagree about the coronavirus. The majority of low- and medium-educated people agree that the media should share all available information about Covid-19, even if it is contradictory, but they also think that scientists should first agree with one another before saying anything about Covid-19 in the media. On the one hand, then, we see a strong need for transparency, while on the other, we see people having trouble interpreting information, especially when it is contradictory. It is important for scientists to communicate clearly, including about uncertainties and the limitations of research. It is also important for journalists, especially science journalists, to seek clarification about and to explain contradictory information.

The public trusts medical research the most.
Of the various types of research, the Dutch trust medical research, such as research into cancer treatment, the most. Next are various types of research into the natural sciences and technology, such as how to build energy-efficient houses. People have the least amount of trust in the various types of social research, such as research into improving Dutch language education programmes. This heightened level of trust in medical research also applies to various types of coronavirus research. People have a lot of trust in research on Covid-19 vaccines and treatment. They have much less faith in research into the economic and social impact of the Covid-19 pandemic. One possible factor here is that people tend to trust research more when they see it has demonstrable results, for example vaccinations leading to a declining infection rate. Another notable point is that they trust research into the effectiveness of face masks least, possibly owing to contradictory reporting on their effectiveness. It may also be related to people’s feeling that the Covid-19 restrictions conflict with their values or personal attitudes. If that is so, they will be more inclined not to trust the underlying research, as we saw in the focus group study we published earlier this year.

The rapid development of Covid-19 vaccines and the major interests involved in that research are reasons to both trust and distrust vaccine research.
Three quarters of the Dutch have ‘a lot’ or ‘a fair amount’ of trust in Covid-19 vaccine research. When presented with a list of possible reasons for trusting or not trusting this research, most of the respondents who do trust it say that they trust the researchers involved and the European Medicines Agency. Most of the respondents who have ‘not a lot of trust’ or ‘no trust at all’ in Covid-19 vaccine research say that the vaccines were developed too quickly. They are concerned about long-term side effects and say that the information they are receiving is contradictory or inadequate.

Looking at the reasons that respondents give for trusting or not trusting Covid-19 vaccine research, we see that the two groups observe the same phenomenon or factor but interpret it differently. For example, many respondents believe there are major interests at stake in vaccine research. People who trust this research see this as a positive factor. They believe that the whole world is watching, that scientists are collaborating and pharmaceutical companies have a financial or other interest in ensuring that the research is conducted properly. Many of those who do not trust the vaccine research take a negative view of these same interests and claim that they are largely about money and not about health. Many respondents also note the speed at which the Covid-19 vaccines have been developed. People who place great faith in vaccine research see that these vaccines are working, or hope that they will work, and regard them as a quick way out of the crisis. Those who have little or no faith in vaccine research think that the vaccines have been developed too quickly and are afraid of the long-term side effects.

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Introduction

In this publication, the Rathenau Instituut presents the results of a survey on public trust in science. The survey was conducted in March 2021 among a representative sample of the Dutch population. Our purpose was to ascertain the state of public trust in science in the Netherlands and whether it has changed in the wake of the Covid-19 pandemic. In addition, we examined which sources of information on the coronavirus the Dutch public trusts and consults, and how much trust it places in Covid-19 research.

This was the Rathenau Instituut's fourth major survey of public trust in science in the Netherlands, following earlier surveys of a representative group of the population in 2012, 2015 and 2018. Because the methodology and sampling have remained identical, we can compare the surveys over time. This report refers several times to these earlier surveys. More information on the methodology used can be found in the Appendix. In the autumn of 2020, the Rathenau Institute also spoke to the members of various focus groups about trust in science. We will refer to this research several times as well.

Reader's guide

Chapter 1 considers the state of trust in science in the Netherlands, whether it has changed because of the pandemic, and which groups trust science. Chapter 2 discusses which sources of information about Covid-19 the Dutch consult and trust, and what they think about contradictory information. Chapter 3 examines how much trust people have in different types of Covid-19 research and the reasons they have for trusting or not trusting Covid-19 vaccine research.

1. What is the state of public trust in science in the Netherlands, and which groups trust science?

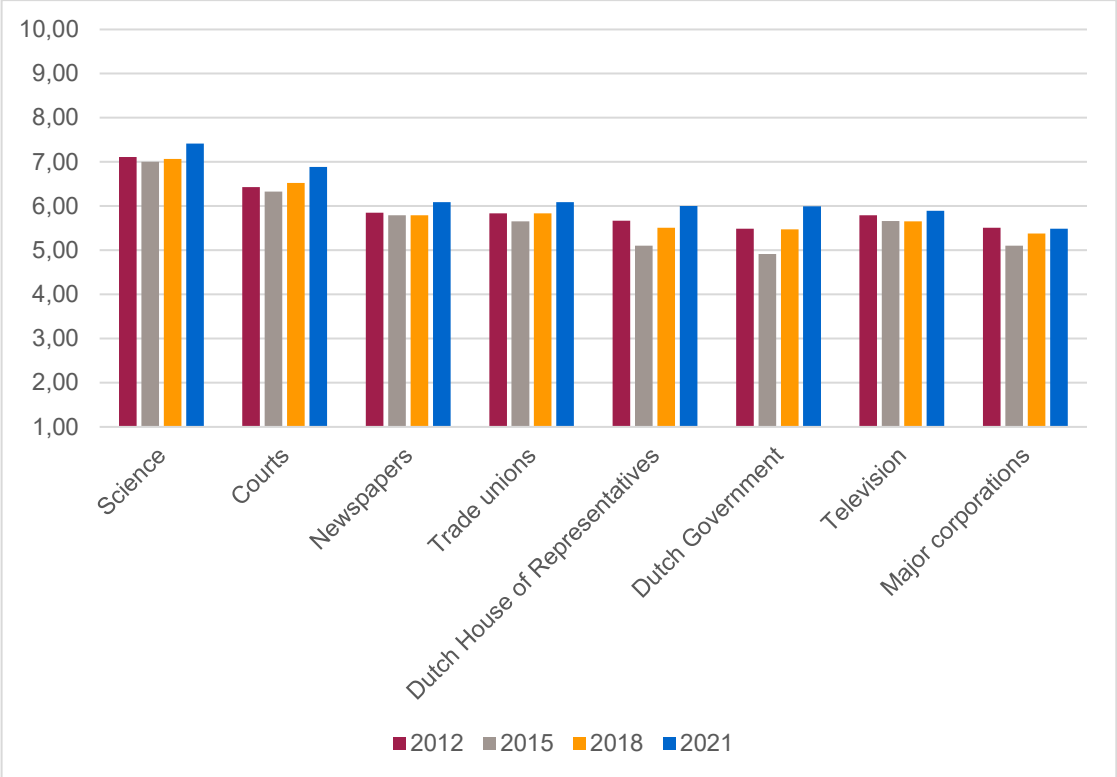
The media regularly report on declining trust in science. In this chapter, we look at the current state of public trust in science in the Netherlands and compare it to public trust in science in previous years and public trust in other institutions. In section 1.2, we examine which groups place more trust or less trust in science.

1.1. Public trust in science has increased

The main question posed in this survey was: 'Can you indicate whether you do or do not trust the institutions below?'. The respondents were asked to indicate the level of trust that they have in each of the institutions on a ten-point scale, with 1 indicating no trust at all and 10 indicating complete trust.

Graph 1 shows the average scores for the various institutions, ranked from highest to lowest, for 2012, 2015, 2018 and 2021.[1] The Dutch have the most trust in science, which received an average score of 7.42 in 2021. This was followed by courts of law (6.88), newspapers (6.09), trade unions (6.09), the Dutch House of Representatives (6.00), the Dutch Government (6.00), television (5.89), and major corporations (5.49).

Graph 1. Average score for trust in public institutions by the Dutch public.



[1] In calculating the averages for trust, we used weighting factors to ensure that the results would be representative for the Dutch population in terms of gender, age, size of household, education, social class and region (see also the Appendix).

What is striking about the graph is that trust in all institutions increased in 2021 compared to 2018, and that these increases are larger than the fluctuations between previous surveys. Confidence in the Dutch House of Representatives increased the most, by almost half a point (compared to 2018), followed by trust in the Dutch Government (0.4 point). Public trust in science and the courts has also increased considerably, by 0.35 point. The smallest increase, 0.11 point, can be seen for the major corporations.

Public trust in science has also risen in other countries. In Germany, the proportion of people who have complete or partial trust in science rose from 56% in September 2019 to 73% in April 2020, only to drop to 66% in May 2020 and to 60% in November 2020, although that is still higher than in 2019 (Wissenschaft im Dialog, 2020). In Sweden, the proportion of people who trust scientists to a great or very great extent rose from 79% in 2019 to 88% in 2020 (Vetenskap & Allmänhet, 2020).

How can these increases in public trust be explained? The Netherlands Institute for Social Research (SCP) conducts similar, quarterly surveys of the Dutch public's trust in institutions and has analysed the outcomes (Miltenburg & Schaper, 2020). It saw a sharp rise in public trust in all institutions it monitors in April 2020, likely due to the Covid-19 crisis (Miltenburg & Schaper, 2020). The increase in public trust in science and other institutions that emerges from our survey can likely also be attributed to the pandemic. Public trust in institutions and politics tends to rise in the face of other types of crises as well, such as a terrorist attack or an airplane crash (Miltenburg & Schaper, 2020). There is no consensus about the mechanism behind this rise (Dekker et al., 2020). It may be due to the 'rally 'round the flag' effect, in which a country's people give their leaders overwhelming support when they act to avert an external threat.

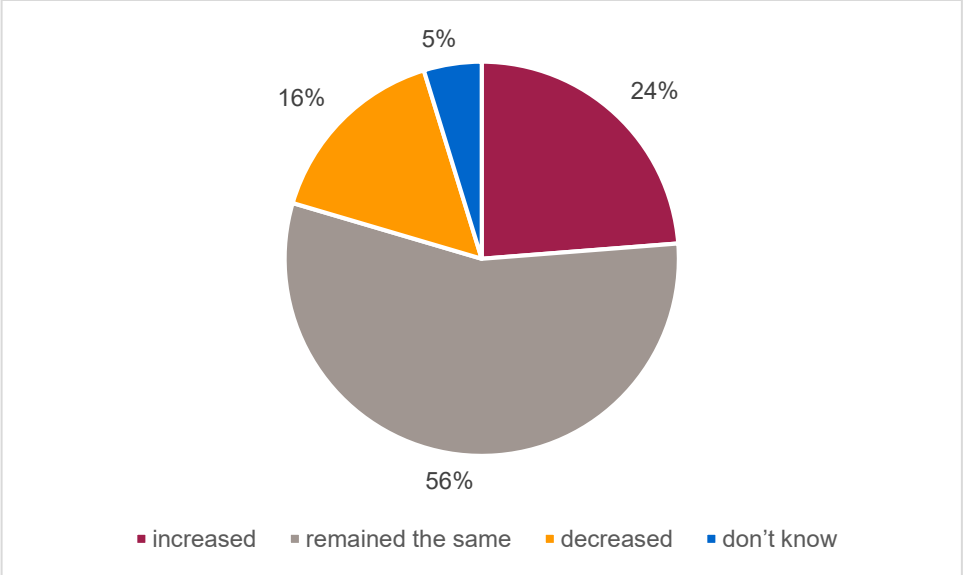
Another possible explanation for the increase in trust is that people regard the government's action during a crisis as useful and reward it in the short term with more trust. That non-political institutions also enjoy more trust may be acknowledgement of their role during the crisis, but it may also be a by-product of the increase in political trust or the result of the public's feeling uncertain and under threat (and wanting to be able to rely on something) (Dekker et al., 2020). Based on previous crises, SCP expects this to be a temporary increase and that trust will return to its former level. We are already seeing this in the figures; in April 2021 (the most recent SCP survey), public trust in most institutions had dropped back to the level before the Covid-19 crisis or lower (Miltenburg et al., 2021). Only trust in the courts remained higher than before the crisis.

Covid-19 led to a predominantly positive change in trust

Based on the SCP's survey outcomes, we had expected that there might be changes in the level of public trust in science. We therefore also asked our respondents whether their trust in science had increased, remained the same or decreased due to Covid-19. Graph 2 shows that the majority of respondents (56%) report that their trust has

remained the same. Almost a quarter (24%) indicate that their trust in science has increased, one in six (16%) that it has decreased, and 5% don't know.

Graph 2. Has your trust in science increased, decreased or remained the same because of Covid-19 (the coronavirus)?



We also asked the respondents to explain their response. The group that says that their trust has remained the same explain that they already trusted science, that their attitude has not changed, and that scientists are 'just doing their job'. For example, they consider that scientists have 'simply done their job, but worked faster' and point out that the Covid-19 vaccines were based on earlier vaccines.

The group indicating that their trust in science has increased often cites the Covid-19 vaccines and the speed with which they were developed as reasons. Many also refer to the wealth of knowledge that research yields, for example about infection rates and about the virus itself. Some are also impressed by the speed with which that knowledge has been developed.

It is notable that the group indicating that their trust in science has decreased also cites the speed with which Covid-19 vaccines were developed as a reason. These people believe that they were developed too quickly and are therefore unreliable. Knowledge plays an important role in their arguments too. Unlike the other group, they feel that Covid-19 research is taking too long and that they are not seeing any results. Many of them are struggling with contradictions and ambiguities. The many different reports and stories that they hear leave them wondering what to believe. Chapter 2 looks more closely at the impact of contradictory information.

Associations with science almost all positive

'Science' is a very broad concept and can be interpreted in many different ways. To get a better idea of what people have in mind when they refer to 'science', we asked them to describe what they associate with the word. As in previous surveys, almost all of their associations are either positive or neutral. Once again, the most frequently mentioned associations are study/studies, knowledge, progress, development and university. Figure 1 shows the most frequent associations in a word cloud, with the font size indicating how often the association was mentioned (in Dutch, a translation of the words can be found in appendix 2). Strikingly, there are no associations that can be qualified as negative. That does not mean that there are no negative associations at all, but only that they were not given often enough to merit a place in the word cloud. Taken altogether, the negative associations mentioned by our survey respondents amount to no more than a few per cent of the total associations (comparable to previous years). Most refer to falsification, fabrication and plagiarism, and to research that is, or can be, influenced by the funding body. Also mentioned are contradictory research results and research that 'takes a long time' and 'is useless'.

Figure 1. Most frequent responses to the question: 'What do you associate with the word "science"?'

1.2. Who trusts science?

Some groups trust science more than other groups. In general, high-educated or high-status respondents have more or significantly more trust in science. For example, high-educated respondents give trust in science an average score of 7.91, whereas low-educated respondents give it an average of 6.60. People who know a lot about science also have more or significantly more trust in it. Trust is also higher or significantly higher among people who have more frequent exposure to science, for example because they read about it in the newspaper or talk to friends and family about it. Age is unrelated to trust in science. These results are consistent with the results of previous surveys (Rathenau Instituut, 2013, 2015 and 2018).

Previous surveys also revealed that trust in various institutions is often correlated (Rathenau Instituut, 2013), and this is once again the case. Someone who puts considerable trust in science often trusts other institutions as well, for example the courts of law, the newspapers and the Government. In that sense, trust in science says more about whether or not people generally trust institutions.

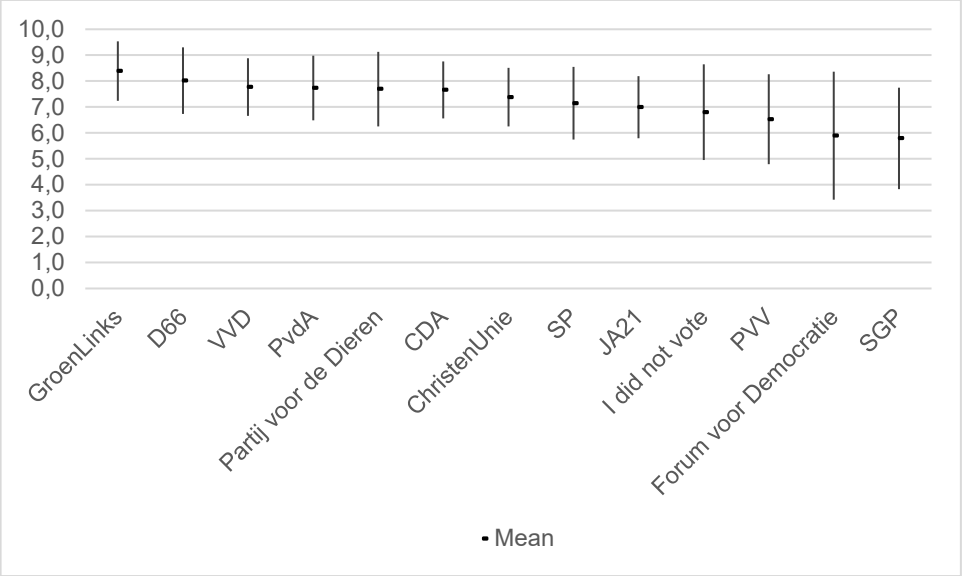
To examine whether trust in science is related to voting behaviour, we decided to conduct the survey shortly after the general elections in March 2021. We begin this section by looking at this question and then consider differences in voting behaviour by educational level. Finally, we zoom in on the group of women over the age of 50, having noted in our 2018 survey that they have significantly less trust in science than men in the same age category (Rathenau Instituut, 2018).

Voting behaviour is related to trust in science and other institutions in general

Research in the USA shows that Americans' trust in science correlates closely with their political preferences. Democratic voters tend to trust science more than Republican voters (Pew Research, 2019). To examine whether voting behaviour correlates with trust in the Netherlands, we conducted our survey immediately after the general elections of 2021 and asked our survey respondents which party they had voted for.

Graph 3 shows the mean trust in science by political party. The vertical line indicates the standard deviation from that mean. We see the highest standard deviation in the case of Forum voor Democratie. In other words, the dispersion is over a wider range than for other parties. We also see dispersion over a relatively wider range among SGP and non-voters.

Graph 3. Average trust in science by political party.



Notes: The graph only shows those parties that gained enough votes for an informed analysis. The dot represents the mean, and the vertical line shows the standard deviation.

Graph 3 shows that, on average, GroenLinks and D66 voters have the most trust in science, followed by VVD and PvdA voters. People who vote for Forum voor Democratie and SGP have the least trust. It is also striking that people who vote for parties on the fringes of the political spectrum (SGP, Forum voor Democratie, Partij voor de Vrijheid, JA21 and SP) tend to have less faith in science, along with non-voters. The graph also reveals a wider dispersion on the right-hand side. In other words, by no means everyone who voted for the SGP or Forum voor Democratie has less trust in science.

Our analysis also considered whether people who voted for a particular party have significantly more or less trust than people who did not vote for that party. What we found was that respondents who voted for SGP have significantly less trust in science than non-SGP voters. The same applies to Forum voor Democratie and Partij voor de Vrijheid (PVV). Non-voters also have significantly less trust in science. On the other hand, those who voted for GroenLinks have significantly more trust in science than non-GroenLinks voters. The same goes for D66, VVD and CDA voters. There is no significant difference in trust among respondents who did and did not vote for JA21, PvdA, SP, CU and PvdD.

Research by Statistics Netherlands has shown that political party affiliation is influenced by trust (in institutions) (Van Enk and Schmeets, 2019). People who have little trust in institutions are more likely to vote for PVV, while voters who have a high level of trust are more likely to vote for D66 and GroenLinks. Trust is also related to voter turnout (Van Enk and Schmeets, 2019). In general, non-voters have less faith in institutions, such as science.

We see this effect in our data as well. For example, D66 and GroenLinks voters trust the courts of law and the Government significantly more than people who do not vote

for either of these two parties. Respondents who vote for Forum voor Democratie, PVV or JA21 also have significantly less trust in the courts and the Government. The same applies to non-voters. A low score on trust in science is therefore related to people's trust in institutions in general, and not only in science.

The situation is somewhat different for respondents who voted for the SGP. Our survey found they have significantly less trust in science than non-SGP voters, but we did not observe a lower level of trust in the courts of law and the Government among them. This may have something to do with the SGP's critical attitude towards such issues as biotechnology and other technologies with which 'scientists and corporations are increasingly able to bend life on earth to their will, or even to build it from scratch' ('*wetenschappers en bedrijven steeds meer mogelijkheden hebben om het leven op aarde naar eigen hand te zetten, of zelfs van de grond af aan op te bouwen'*) (source: www.sgp.nl). Given the relatively small number of respondents in this group, we cannot say that this conclusion applies to all SGP voters.

Trust in science increases with educational level
As in our previous surveys, we see that level of education correlates with trust in science. On average, people with a lower level of education have less trust in science. For example, low-educated respondents scored an average of 6.6 for trust in science, medium-educated a 7.23, and high-educated a 7.91.

Earlier, we saw that trust in science rose between 2018 and 2021. This is especially among the high- and medium-educated. Compared to 2018, trust in science among the high-educated rose by 0.4 points (from 7.5 to a 7.9 average) and among the medium-educated by 0.3 points (from 6.9 to a 7.2 average). Among the low-educated, the increase relative to 2018 is minimal at 0.07.

No differences based on age and gender
We see no significant differences based on age or gender. Men and women have the same level of trust and this also applies to older and younger generations. Our earlier surveys on trust in science revealed that women over the age of 50 trusted science significantly less than men in the same age group. That difference has not reappeared in this latest survey.

Looking at the average level of trust that women over 50 have in science, we see that it has increased considerably. In 2018, women above the age of 50 gave their trust in science an average score of 6.65. In 2021, their score rose to 7.34. This increase exceeds that for men above the age of 50 and for men and women below 50. Table 1 shows the average scores.

Table 1. Average trust in science in 2018 and 2021 by gender and age group.

	2018	2021	Difference
Man < 50	7.16	7.32	0.16
Man > 50	7.29	7.49	0.20
Woman < 50	7.09	7.50	0.41
Woman > 50	6.65	7.34	0.69

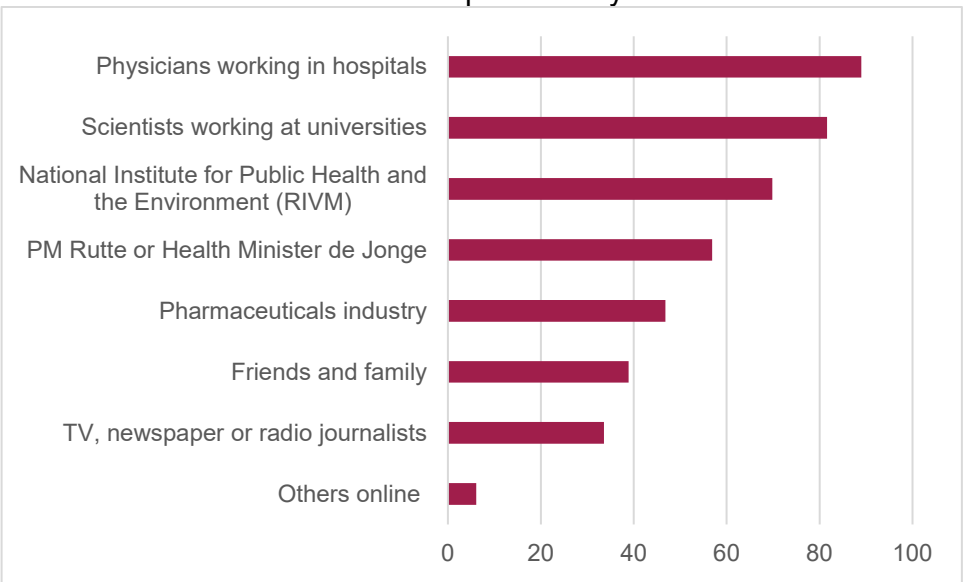
2. Trustworthy information about Covid-19

The coronavirus has dominated the news and many conversations in the past year. Many people felt the need for trustworthy information about Covid-19. Research shows that people spent more time reading and listening to the news during the pandemic (Motivaction, 2021). In this section, we look at how much people trust and consult various sources of information. We also discuss what people think of contradictory information, as our focus groups about trust in science revealed that people find it difficult to deal with such contradictions (Rathenau Instituut, 2021).

2.1. Most trusted source of information on Covid-19: Physicians working in hospitals

To allow us to reach further conclusions about trust in science, our survey asked respondents how much they trusted various sources of information about the coronavirus and Covid-19. People place the most trust in information provided by physicians working in hospitals, with 89% of our respondents stating that they had a fair amount or a lot of trust in them. Next in line at 82% are scientists working at universities. Seventy per cent of respondents said they trust the National Institute for Public Health and the Environment (RIVM), while 57% trust information provided by Prime Minister Mark Rutte or Health Minister Hugo de Jonge. Only 34% trust television, newspaper or radio journalists, a lower percentage than those who trust information provided by friends and family (39%).

Graph 3. Percentage of people who have a ‘fair amount’ or ‘a lot’ of trust in information about the coronavirus provided by...

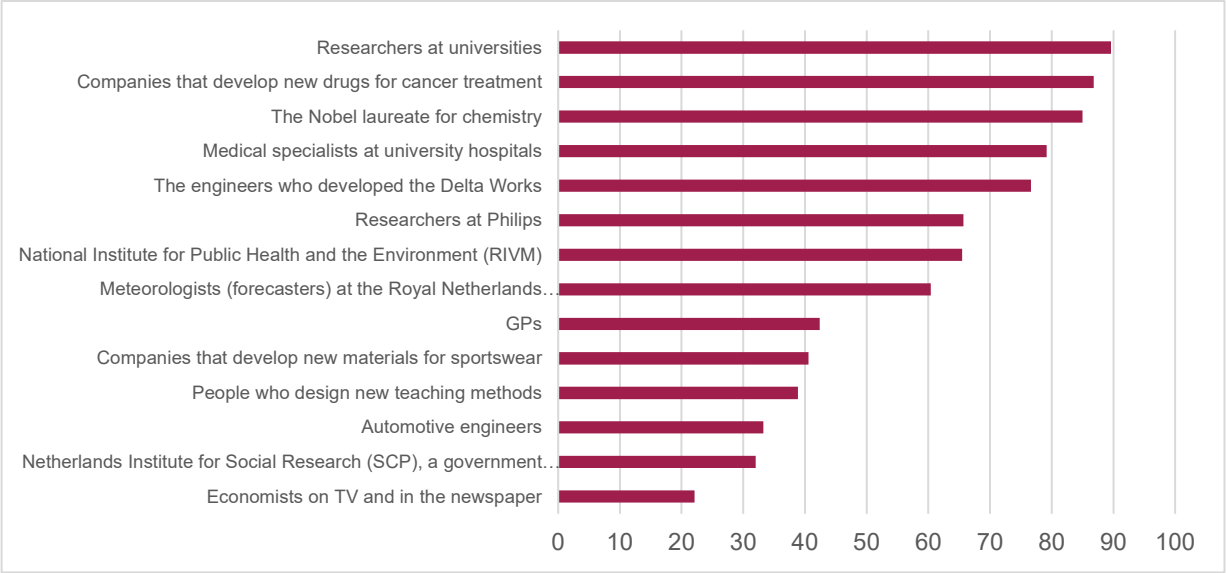


Notes: Instead of ‘PM Rutte or Health Minister de Jonge’, the wording in the survey was ‘outgoing Prime Minister Mark Rutte or outgoing Minister Hugo de Jonge of the Ministry of Health, Welfare and Sport (VWS)’.

These results are similar to those of previous surveys in which we enquired about trust in sources of information on vaccinations (Rathenau Instituut, 2018). The ranking is the same and the percentages are also fairly similar. The results are also comparable to those of two other surveys abroad, specifically a German survey on trust in science conducted in May 2020 (Wissenschaft im Dialog, 2020) and a Swedish survey (Vetenskap & Allmänhet, 2020). There too, the results showed that people trust physicians the most, followed by scientists, and that they have the least trust in journalists (the German and Swedish surveys did not enquire about other people online).

The National Institute for Public Health and the Environment (RIVM) was in the news constantly during the pandemic. The RIVM advises the Dutch Government and informs the public about Covid-19. Graph 4 shows that 70% of people trust the Covid-19 information issued by the RIVM. To examine how respondents perceive the RIVM, we asked them whether they consider it to be part of the science sector, and, for context, which other parties they regard as belonging to the science community. Our response categories covered various domains of science and types of organisations engaged in science. The results show that almost two thirds of the respondents (65%) consider the RIVM to be part of the science sector, a figure comparable to that for meteorologists at the Royal Netherlands Meteorological Institute (KNMI), another public knowledge organisation. Four categories rank higher in our respondents' estimation. At the very top are researchers at universities, with 90% of respondents considering them to be part of the science community. Next come companies developing new drugs for cancer treatment (87%), the Nobel laureate for chemistry (85%) and medical specialists at university hospitals (79%). GPs and the Netherlands Institute for Social Research (SCP) rank much lower than the RIVM.

Graph 4. Percentage of respondents who regard a category as part of the science community.

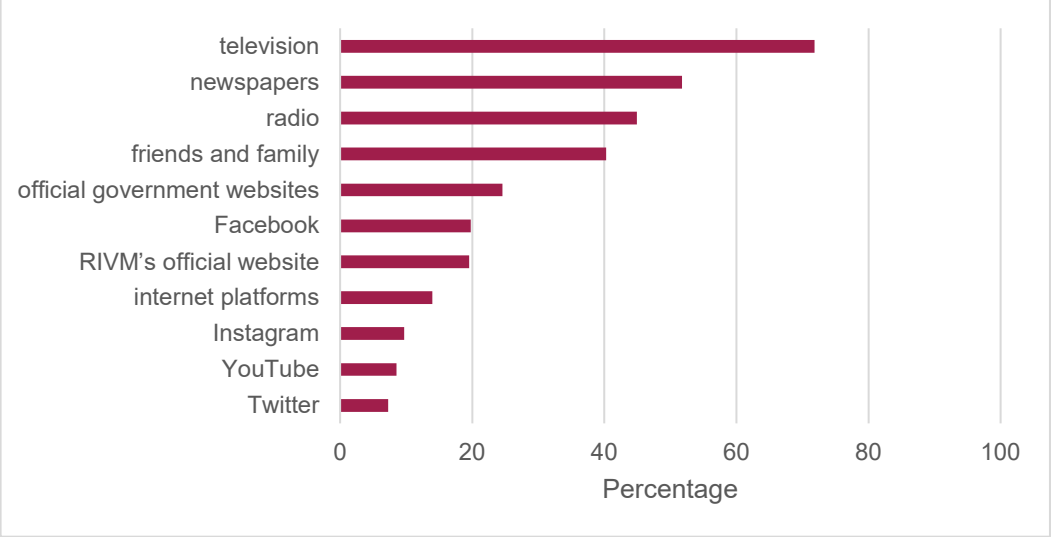


In other words, scientists who furnish information about the coronavirus enjoy considerable trust, but people trust physicians even more on that topic. People also have a lot of faith in the RIVM, perhaps because almost two out of three consider it to be part of the science community. They tend not to trust TV, newspaper or radio journalists, a topic that we will discuss in more detail in the next section.

2.2. Most consulted source of information on Covid-19: Traditional media

We also asked our respondents which sources of information they consult to find out about the coronavirus, and how often they do so. Graph 6 shows that the traditional media remain broadly popular as a source of information, with 72% of our respondents turning to television on a daily or weekly basis for information on Covid-19, followed by newspapers (52%), the radio (45%) and friends and family (40%). It should be noted that we cannot comment on the specific television programmes or broadcasters that people turn to for information, although this may say more about the type of information they receive. Interestingly, Graph 6 shows that people consult Facebook about as often as the RIVM's official website as a daily/weekly source of information. Note, however, that around 40% of people rarely if ever access the RIVM's website, compared to 70% who never or almost never go on Facebook. It is also not possible to determine from our data which Facebook pages or groups people get their information from. The RIVM and various government organisations are also active on Facebook, for example. People make less frequent use of other newer media, such as internet platforms, Instagram and YouTube, to obtain information about Covid-19. A large group (varying between 73% and 86%) never or almost never consults these media for such information.

Graph 5. Percentage of Dutch population that consults a particular source of information on a daily or weekly basis about COVID-19 (the coronavirus).

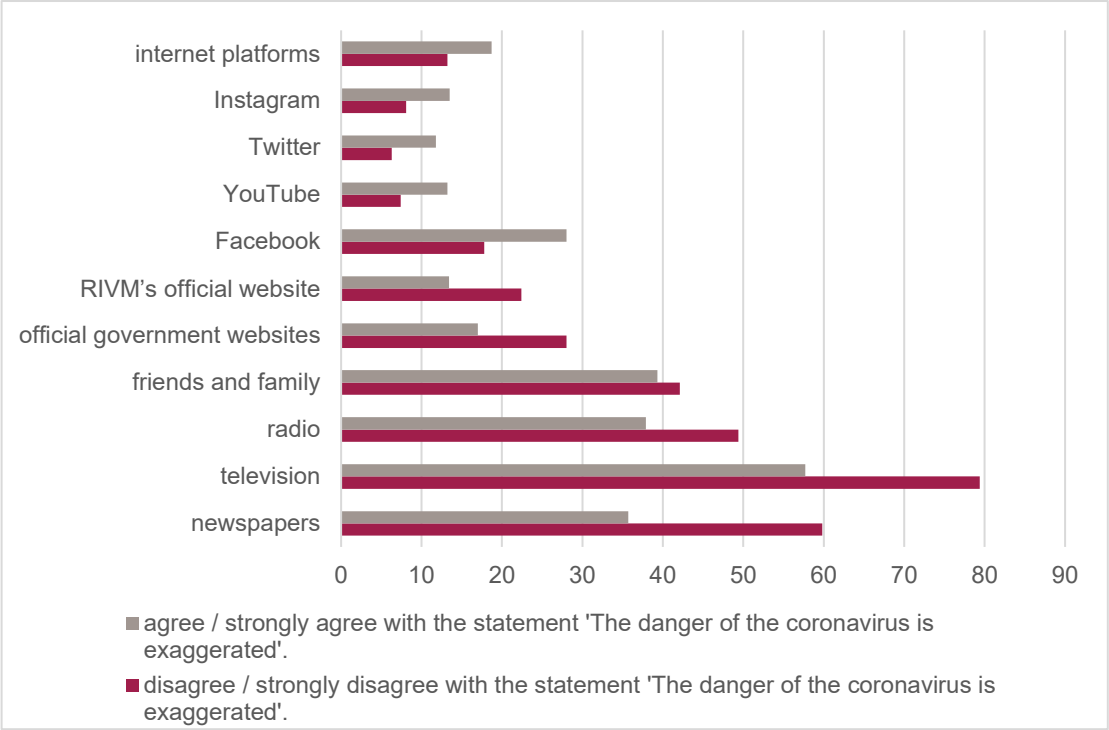


We saw in the previous section that journalists are not considered very trustworthy. In this section, however, we have seen that people do tend to consult the media that employs journalists – i.e. television, newspapers and radio – most often. The same contradiction can be seen in the German and Swedish surveys noted above (Wissenschaft im Dialog, 2020; Vetenskap & Allmänhet, 2020). Other research shows that there is a high level of trust in the media in the Netherlands. A recent study reveals that about two thirds of the Dutch population believe that both the news in the Netherlands and the news they themselves consume is trustworthy (Motivaction, 2021). Compared to other Western countries, trust in the news media in the Netherlands is relatively high. The Dutch hold traditional media in particularly high esteem (Reuters Institute for the Study of Journalism, 2020). One possible explanation for the low level of trust in television, newspaper and radio journalists is a discrepancy between the associations people have with journalists working for certain media and the media themselves. Another possible explanation is that we did not refer to any specific programme or newspaper and that people's trust can vary greatly between them. For example, many people trust the NOS public news service and its newsreaders, but far fewer trust shock blog GeenStijl or journalist and chat show host Margriet van der Linden (Reuters Institute for the Study of Journalism, 2020; Motivaction, 2021).

People who have more faith in science tend to consult traditional media (television, newspapers and radio) more often than people who trust science less. For example, 60% of people who give their trust in science a score of 8 or higher read newspaper articles about Covid-19 on a daily or weekly basis, whereas 27% who score it as 5 or lower do not do so. Those who trust science the least (a score of 5 or lower) are also less likely to seek out information about the coronavirus. This group turns to television (49%), friends and family (43%), radio (30%) and Facebook (27%) for daily or weekly information.

We also see differences in information sources between those who agree and those who disagree with the statement ‘The danger of the coronavirus is exaggerated’. People who tend to get their information from traditional media (television, newspapers and radio) are more likely to disagree or strongly disagree with this statement. Those who are inclined to turn to new media, including Facebook, YouTube and Instagram, are more likely to agree or strongly agree with the statement.

Graph 6. Estimated danger of coronavirus by information source.



Notes: Proportion of Dutch population consulting a particular information source on a daily or weekly basis.

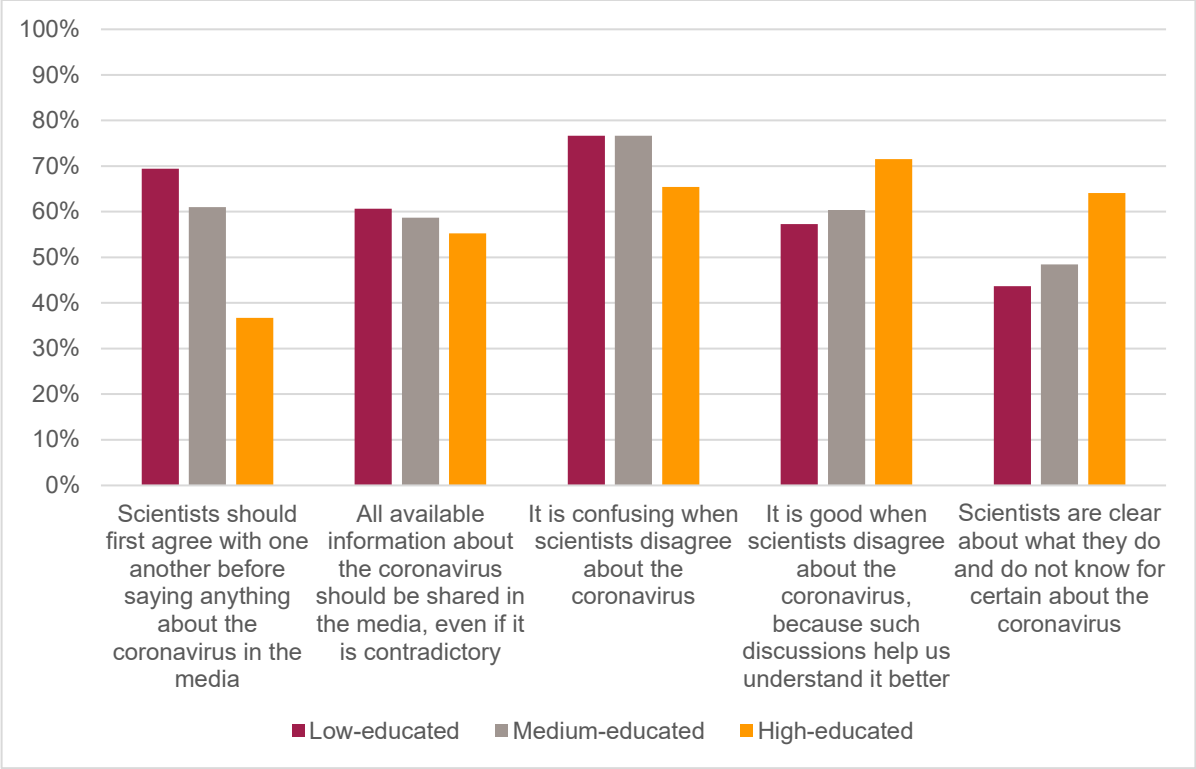
2.3. Contradictory information erodes trust

Many conversations and discussions during the pandemic concerned matters that were unclear. There were debates about whether and to what extent face masks were effective and to what degree aerosols played a role in spreading the virus. The same issues came up in the group discussions that we held in the autumn of 2020 (Rathenau Instituut, 2021). Contradictory information erodes people’s trust and causes unrest. For example, in the autumn of 2020, the VO-raad, an employers’ association representing schools and school boards in secondary education, called on scientists not to debate Covid-19 in the media (EenVandaag, 2020) because it was no longer clear to people whether they should be listening to the Government, the Outbreak Management Team, or scientists appearing on television. To understand what people think of contradictory information and the role that educational background plays in this regard, we asked our respondents to consider a number of statements.

What we see is that most people find it confusing when scientists disagree about Covid-19. Among low- and medium-educated respondents, 77% agree or strongly agree with this statement (see Graph 8). High-educated respondents are less or significantly less

likely to agree. Even so, almost two out of three (65%) in this group agree or strongly agree with this statement.

Graph 7. Proportion of Dutch population who agree or strongly agree with statements about Covid-19 communication (broken down by level of education).



Low-educated respondents are also more or significantly more likely to agree or strongly agree with the statement ‘Scientists should first agree with one another before saying anything about the coronavirus in the media’. Among low-educated respondents, 69% agree or agree strongly with this statement, as opposed to 61% of medium-educated and 37% of high-educated respondents. Interestingly, most of the low- and medium-educated respondents also agree or strongly agree with the statement ‘All available information about the coronavirus should be shared in the media, even if it is contradictory’. On the one hand, then, the majority of people think that information should always be shared (transparency is important to many people); on the other hand, low- and medium-educated people in particular also believe that scientists ought to agree with one another before they speak out.

We found this same contradiction in our focus groups on trust in science (Rathenau Instituut, 2021). Although people feel an urgent need for information, having a lot of information does not make them trust science more because they have trouble making sense of the science and because the information is contradictory at times. Contradictory reports or rapidly changing scientific views do not inspire public trust (Rathenau Instituut, 2021). Low-educated individuals are also less likely to think that scientists communicate clearly, with 44% agreeing or strongly agreeing with the

statement ‘Scientists are clear about what they do and do not know for certain about the coronavirus’, compared to 64% of the high-educated.

In past year, the pandemic gave the public a glimpse of how science works. For example, there have been many discussions on Dutch radio and TV chat shows about what we know about the coronavirus. It became clear to people that science is not always straightforward. In her annual address, the president of the Royal Netherlands Academy of Arts and Sciences (KNAW) said that science can be a matter of ‘failing forward’, of constantly weighing things up, evaluating, backtracking, adjusting and carrying on again (KNAW, 2021). But we see that most people find it confusing when scientists disagree about Covid-19. Most low- and medium-educated people think that scientists should agree first before they comment on the coronavirus in the media, and not all of them think that scientists communicate clearly about what they know and do not know for certain. These results back up the conclusions drawn from our focus groups, i.e. that it is important for scientists to communicate clearly, including about the uncertainties and limitations of their research, and for science journalists to investigate and clarify contradictory information (Rathenau Instituut, 2021). The question is whether this can resolve the paradox of people wanting transparency about science on the one hand but also wanting clear and unambiguous information on the other. That would require more research.

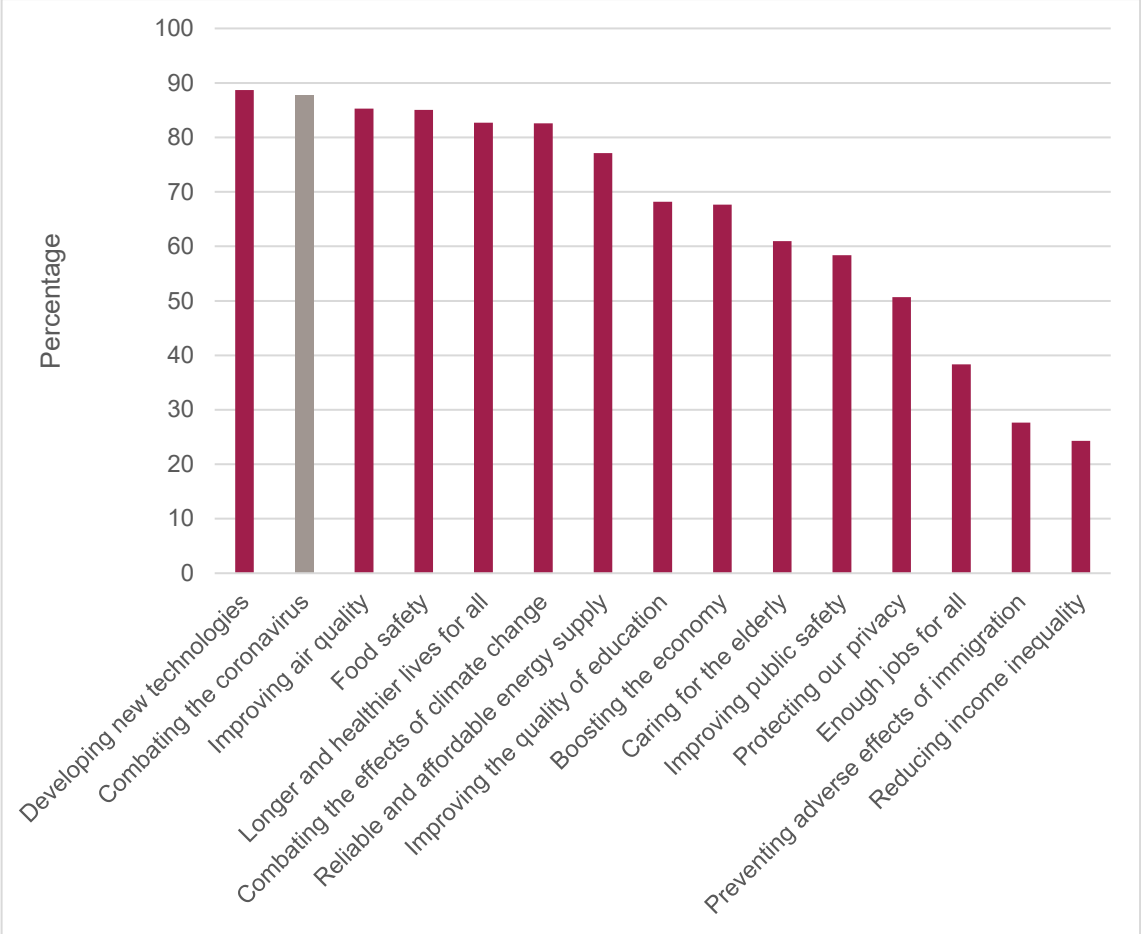
3. Expectations of and trust in Covid-19 research

Science is a broad concept that consists of many different types of research. In this chapter we look at what people expect of science and how much they trust different types of research. We zoom in specifically on Covid-19 research and why the Dutch do or do not trust it.

3.1. High expectations of science's role in combating the pandemic

In our survey, we asked respondents whether they expect science to contribute to solving problems in 15 different areas. For example, we asked them whether they expected science to contribute to better air quality, a longer and healthier life for all, or elderly care. The responses are similar to those in 2018 (Rathenau Instituut, 2018). Most people think that science will contribute to new technologies, with 89% stating that it will contribute 'definitely' or 'somewhat'. Only a few think that science will help reduce income inequality.

Graph 8. Percentage of respondents who think that science will contribute 'definitely' or 'somewhat' to the stated objectives.



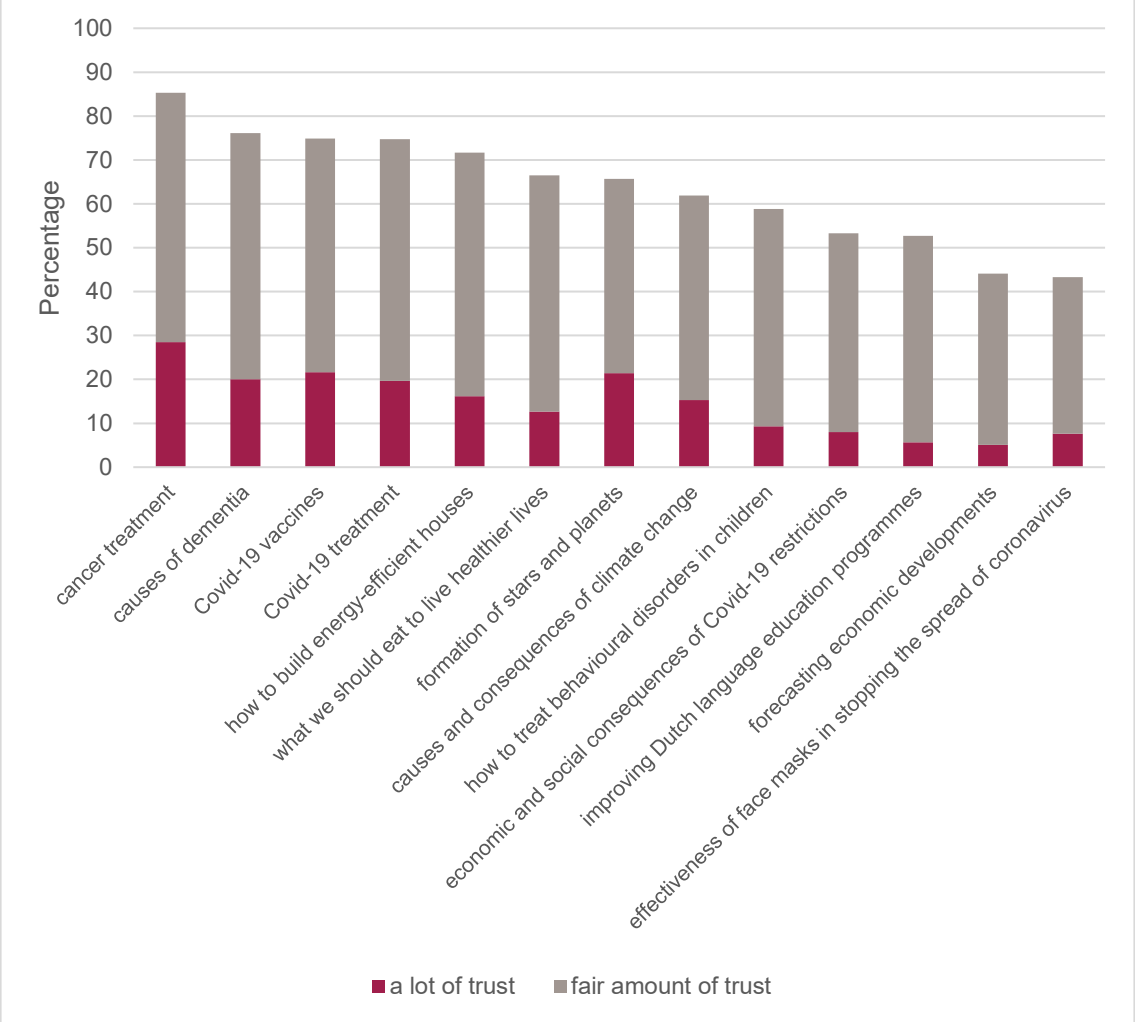
This year we also asked our respondents whether they thought science would help in the fight against Covid-19. Eighty-eight per cent think that this will indeed be the case. In other words, with the sole exception of new technologies, people expect the most from research on combating the pandemic.

3.2. Trust in medical (Covid-19) research highest

During our focus groups on trust in science, we saw that people have very outspoken ideas about when research can be trusted, and about what they consider ‘good’ research methods (Rathenau Instituut, 2021). For example, laboratory research is highly trusted. People also like to see results (‘If it works, it’s true’). To help us ascertain how much faith people have in Covid 19-related research, we asked our respondents how much they trust different types of research. The results are shown in Graph 10. We see that people trust cancer research the most and research on the effectiveness of face masks in stopping the spread of Covid-19 the least.

What is notable in Graph 10 is that medical research enjoys the greatest degree of trust. People trust cancer research the most, followed by research into the causes of dementia. Next come research on Covid-19 vaccines and Covid-19 treatment. The medical research topics are followed by topics in the natural sciences and technology: how to build energy-efficient houses, what to eat to live a healthier life, the formation of stars and planets, and the causes and consequences of climate change. People have the least trust in social research: on the economic and social consequences of the Covid-19 restrictions, improving Dutch language education programmes and forecasting economic developments. At the very bottom is research on the effectiveness of face masks in stopping the spread of Covid-19.

Graph 9. Percentage of respondents who have ‘a lot of trust’ and ‘a fair amount of trust’ in certain types of research.



Notes: in descending order of research in which respondents have ‘a lot’ and ‘a fair amount’ of trust.

It is notable that our respondents trust four different forms of medical research most, but have the least faith in research on the effectiveness of face masks. There may be various reasons for this, one being the contradictory reports on the effectiveness of masks. The members of the focus groups on trust in science organised in the autumn of 2020 frequently brought up the subject of face masks (Rathenau Instituut, 2021). They often pointed out the contradictory reports on their effectiveness at stopping the spread of the coronavirus. It was unclear to them whether or not face masks were in fact effective and who they could trust in that regard. What we noticed in the focus groups was that the contradictory reporting on mask effectiveness had a major impact on trust in science (Rathenau Instituut, 2021). Another possible reason for our respondents’ lack of trust in face mask research is that they do not support the rule obliging people to wear masks. For example, they feel it conflicts with their values or personal attitudes, in which case they are less inclined to trust the underlying research (Rathenau Instituut, 2021).

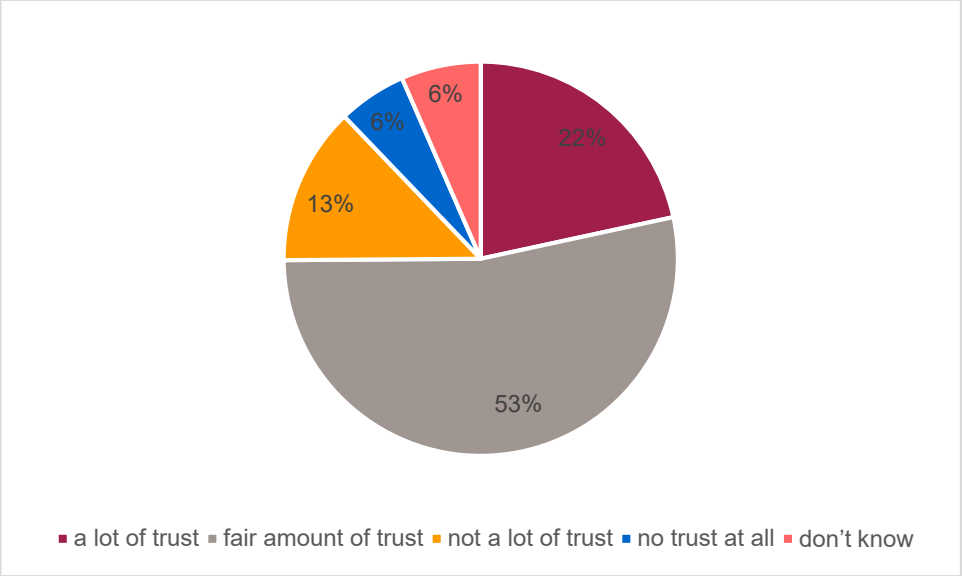
If we relate these outcomes on trust to the expectations reported above, we see that many people have high expectations and place considerable trust in research in the domains of ‘health care’ and ‘natural sciences and technology’. They have lower expectations and less trust in research in the social domain. This is not the final word about how important they consider the various types of research, however. In the 2015 survey, we asked our respondents to divide a sum of €100 million between a number of research topics in three domains, i.e. ‘healthcare’, ‘natural sciences and technology’ and ‘social sciences and humanities’ (Rathenau Instituut, 2015). Research topics in the healthcare domain were allocated half of the sum (50.8%). The two other domains were allocated about a quarter (24.5% for natural sciences and technology and 24.7% for the social sciences and humanities). In other words, people attach considerable importance to various social research topics, but they do not expect scientists to work miracles (Rathenau Instituut, 2015). There may also be other factors involved. One is that people tend to trust research more when they see it has demonstrable results. If it works, they trust it (Rathenau Instituut, 2021). For example, they see that far fewer people die of cancer nowadays than in the past, and that could be a reason why they trust cancer research. The same may apply to the Covid-19 vaccines. People’s willingness to be vaccinated has increased in recent months, possibly because they can see that the number of infections is falling. Research into the construction of energy-efficient houses also demonstrates whether the proposed systems work. Research that involves forecasting economic developments, however, involves many more factors and uncertainties, and that is why people could trust it less. Here again, values and standards may also play a role, as well as the associated ‘gut feeling’ (Rathenau Instituut, 2021). If a person’s intuition tells them that a research topic is ‘right’, they will be more likely to trust the research. Conversely, participants can also be suspicious of a topic in advance, and therefore mistrust the research (Rathenau Instituut, 2021).

3.3. Reasons for trusting Covid-19 vaccines

Given the topicality of the issue, this section zooms in on trust in Covid-19 vaccine research and why people trust it.

We saw in the previous section that 75% of our respondents have ‘a lot’ or ‘a fair amount’ of trust in Covid-19 vaccine research. Nineteen per cent have little or no trust, and 6% don’t know.

Graph 10. To what extent do you trust Covid-19 vaccine research?



Looking at different groups, we see that education also plays a role here. High-educated people trust Covid-19 vaccine research more than low-educated people do. We also see that those who think the danger of Covid-19 is exaggerated have less faith in the relevant vaccine research.

To find out why people do or do not trust Covid-19 vaccines, we presented our respondents with a list of reasons and also asked them to state their own. We presented those who trust and those who do not trust Covid-19 vaccines with different reasons.

Reasons to trust Covid-19 vaccine research

Ninety-four per cent of those who trust or have a lot of trust in Covid-19 vaccine research say this is because the researchers involved are vaccine experts. Other important reasons:

- because the researchers involved work with great care (89% agree or strongly agree);
- because they trust the European Medicines Agency (EMA), which assesses whether vaccines are safe and effective (86% agree or strongly agree);
- because the researchers involved follow the rules of science (84% agree or strongly agree).

It is striking that the major reasons concern the researchers and the monitoring body. The majority of those who trust the vaccine research agree or strongly agree with the other reasons presented as well, but the percentages are slightly smaller:

- because the researchers involved are objective and independent in their work (68%);
- because enough information is provided about the research (64%);
- because they trust the pharmaceutical industry (57%);
- because they are hearing mostly positive reports about the Covid-19 vaccines (54%).

The responses to the open questions also show that people have a lot of faith in researchers. Some 21% say they trust the researchers involved because they are competent, transparent and doing their utmost.

Another important reason to trust the Covid-19 vaccines is that the whole world is working on them and watching, according to some 32% of the respondents. They point out that the vaccines are being investigated and shared worldwide, that the research is being monitored closely, and that the whole world is watching. They also say that it is crucial for the pharmaceutical companies to do the work properly, not only for financial reasons but also for their reputations. The focus groups we conducted for another study also clearly show that people find it very important for multiple studies to be conducted, for scientists to work together and for them to question one another critically (Rathenau Instituut, 2021). All these factors contribute to public trust in science.

The final key reason for trusting the Covid-19 vaccine research is that people see that it is working, or hope that it works and will offer a way out of the crisis. About 19% of the responses to the open questions state this. People see the number of infections falling in countries where the vaccines are being administered. Others see the vaccine as the only solution.

Reasons not to trust Covid-19 vaccine research
Ninety-one per cent of those who have little or no trust in Covid-19 vaccine research say this is because the research has only looked at short-term side effects. Other important reasons respondents give are:

- because the research was carried out (too) quickly (87%);
- because they hear contradictory reports about the vaccines (86%);
- because not enough information is provided about the research (85%).

The main reasons for not trusting Covid-19 vaccine research are therefore that people do not trust the research (too quick, side effects) or because they have not received enough or have heard contradictory information. People consider the other reasons presented as important as well, but the percentages are slightly smaller:

- 73% say they do not trust the pharmaceutical industry;
- 68% say that the researchers involved have modified their research data to get the answers they want;
- 68% say they do not trust the European Medicines Agency (EMA), which assesses whether vaccines are safe and effective;
- 36% say they do not trust the vaccines because some have been developed in Russia and China.

The responses to the open questions also show that people think that the vaccine has been developed too quickly and that they are worried about side effects, with 30% of the responses addressing these issues. Another large group (29%) is concerned about the financial or other interests involved. They believe that the pharmaceutical companies are only interested in the money or that government has interfered in the

research. The final group (14%) has lost faith in the research because of contradictory reporting about the vaccines or because they think information is lacking or being withheld.

Groups that trust/do not trust the research observe the same phenomenon or factor but interpret it differently
Looking at some of the reasons for people to trust or not trust Covid-19 vaccine research, we see that they have the same information but interpret it differently.

For example, many respondents consider that there are major interests at stake in Covid-19 vaccine research. People who trust the research think that the whole world is watching, that scientists are collaborating, that the research is being monitored closely, that the whole world is working on it, and that pharmaceutical companies have a financial or other interest in ensuring that the research is conducted properly. Many people who do not trust the vaccine research stress the same financial or other interests, think that the research is biased, and say that it is largely about money and not about health. Whereas the group that trusts the research believes that the major interests involved make the vaccine research reliable, those major interests are precisely why the group that mistrusts the research finds it unreliable.

We see a similar division when it comes to the observation that the Covid-19 vaccines have been developed quickly. The people who trust the research say they do because the vaccine works or because they hope it will work. They think or hope that the vaccines will offer a way out of the crisis. Those who have little or no trust in the Covid-19 vaccine research think that the vaccines have been developed too quickly and are afraid of the longer-term side effects; they also mistrust the safety of the vaccines or question their safety owing to contradictory reporting about them. Whereas those who trust the research think the vaccines will offer a way out of the crisis, many people who do not trust it are afraid that the vaccines will simply create new problems.

4. Concluding remarks

This report may conjure up the image of a society divided between a majority that trusts both science and research into Covid-19 vaccines and a smaller group having little trust in either one. But this division is not as strict as it may seem.

If we look at the group that has ‘not a lot of trust’ or ‘no trust at all’ in Covid-19 vaccine research, we see that most do trust science in general. Sixty-eight per cent of this group give trust in science a score of 6 or higher. Even among those who have ‘no trust at all’ in vaccine research, the majority still trust science, with 53% scoring it a 6 or higher.

These results are only logical. There are multiple reasons for people trusting or not trusting science and research into Covid-19 vaccines. For example, people may generally have great faith in science, but feel that the research into Covid-19 vaccines has moved too quickly. Or they may trust science but not vaccine research because the two concepts evoke very different associations for them.

If we zoom in on the group that trusts science the least (those giving it a score of 4 or lower), we see that most of them do not trust Covid-19 vaccine research. Sixty percent say they have ‘not a lot of trust’ or ‘no trust at all’ in vaccine research. On the other hand, almost a quarter (24%) say they have ‘a fair amount of trust’ or ‘a lot of trust’ in the research. Sixteen percent ‘don’t know’. Of the group giving trust in science a score of 4 or lower, a large proportion also places little trust in other institutions or in other research. Nevertheless, a majority of them (52%) do have ‘a fair amount of trust’ or ‘a lot of trust’ in research into cancer treatment. Here too, then, the division is not a strict one.

There are also people who trust science but who, in a specific case, question the results of a study because they seem counterintuitive or do not live up to expectations. People do not immediately believe results that seem counterintuitive to them (Rathenau Instituut, 2021). When they disagree with a policy measure based on scientific arguments, they seek out the scientific evidence and often end up questioning the methods used (Rathenau Instituut, 2021). Trust in science is therefore a complex affair that can be influenced by many different factors.

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Appendix 1 Methodology

The Rathenau Instituut has surveyed public trust in science in the Netherlands every three years since 2012. We developed the first survey in that year in cooperation with the WRR because of a commonly held assumption at the time (at the Royal Netherlands Academy and in government) that trust in science was in decline. There was insufficient proof for this assumption, however, nor had such a decline been detected in other countries that had been surveying public trust in science for decades (United Kingdom and United States). Why should that be otherwise in the Netherlands? It was clear that empirical evidence was needed to support the public and political debate on this subject.

For the first survey, we developed a questionnaire that, in addition to determining the level of public trust in science, also examined psychological backgrounds such as 'unease'. The second survey, carried out in 2015, used the same basic set of questions as the first but also looked at the public's engagement in science and, more particularly, was used to help to set the Dutch national research agenda (e.g. which subjects should be studied and what their value was to society). The third survey, in 2018, presented questions inspired by a striking paradox: on the one hand, the public regards science as important and expects it to make a major contribution to a long, healthy and, if possible, interesting life. To use the knowledge that science produces to achieve that long, healthy and interesting life, however, scientists must cooperate with business and government, and when they do – especially when they carry out research commissioned by government or business – public trust in them declines. We examined this paradox by asking our respondents detailed questions about the competence, reliability and integrity of scientists in various situations (working independently or working for government or business). The fourth and present survey focuses on our chosen subject of the coronavirus or Covid-19. The questions were designed to help us understand any growth or decline in trust in science. We also asked what sources of information our respondents consult and trust, and what they think of contradictory information. Finally, we asked how much trust people have in Covid-19 research and the reasons they have for trusting or not trusting Covid-19 vaccine research.

Many of the questions are the same as in the three previous surveys. Because the methodology and sampling are identical, responses to these questions can be compared over time.

All four surveys used NIPObase as the source of data for the random sample. NIPObase is a database of households willing to participate in surveys conducted by Kantar Public and Kantar TNS. This was also the group to which the Rathenau Instituut distributed its 2012, 2015 and 2018 surveys. The SCP's Continuous Survey of Public Perceptions (*Burgerperspectieven*) and the Eurobarometer survey also make use of this method, and of Kantar.

The database from which we draw our sample has data on approximately 140,000 individuals, around 120,000 of whom are 18 years of age or older. The respondents complete the survey online. We recruit the panel mainly by means of traditional research instruments. Kantar Public queries individuals' willingness to take part in the panel in face-to-face and telephone interviews. Each of the surveys has made use of random sampling, so that every group in society has the same chance of being included in the sample. Respondents cannot register with NIPObase themselves.

The survey data was collected using Computer Assisted Web Interviewing. Our aim was to obtain a sample representative for the Dutch population in terms of gender, age, household size, education, social class, and region. This sample was based on reference data taken from the Golden Standard (*Gouden Standaard*) for representative sampling. The sample consists of individuals aged 18 years and older.

We carried out our fieldwork from Friday 19 March to Thursday 1 April 2021, with a total of 1,513 panel members filling in the questionnaire. Owing to selective response, the composition of the response sometimes deviates from the composition of the population. We corrected for this by reweighting the data, with reference data being based on the Golden Standard. An overview of the sample's composition before and after weighting is provided in the following table:

variables	**reference data**	**unweighted**	**weighted**
Gender	%	%	%
male	49	49	49
female	51	51	51
Age			
18 – 34 years	27	26	27
35 – 44 years	15	15	15
45 – 54 years	18	19	18
55 – 64 years	17	17	17
65 and older	23	22	23
Household size			
1 person	22	22	22
2 persons	37	36	37
3 persons	16	16	16
4 persons	17	17	17
5 persons or more	8	8	8
Education			
low (up to junior general	21	23	21
secondary / Dutch MAVO)	40	38	40
medium (VET to pre-university)	39	39	39
high (higher professional and upwards)			
	25	23	25
Social class	25	27	25
A (higher)	19	19	19
	17	18	17
B1	14	13	14

B2			
C			
D (lower)	12	12	12
	33	33	33
Region	10	10	10
three largest Dutch	21	21	21
municipalities	24	24	24
rest of the west/peripheral municipalities			
north			
east			
south			

Differences between the unweighted sample and the reference data are small, with only small weighting factors being necessary:

- maximum weighting factor = 2.102209
- minimum weighting factor = 0.371615
- only two weighting factors are outside the range of 0.6-1.4.

The total weighting efficiency is 92.3%.

This report refers several times to low-educated, medium-educated or high-educated persons. We define these terms as follows:

Low-educated: no education; primary education; pre-vocational secondary (LBO/VBO/VMBO) education (VMBO: middle-management and basic vocational programmes), vocational education & training/VET level 1 (MBO1).
Medium-educated: junior and senior general secondary education (MAVO/HAVO), pre-university education (VWO), pre-vocational secondary education (VMBO: theoretical and combined programmes); vocational education & training/VET levels 2, 3, 4 (MBO or old MBO structure).
High-educated: higher professional education (HBO) and academic (WO) propedeutical phase, bachelor's, master's or PhD.

Appendix 2 Translation of the Dutch words in figure 1

allerlei	all sorts
alles	everything
analyse	analysis
astronomie	astronomy
belangen	interests
belangrijk	important
betrouwbaar	trustworthy
bevestiging	confirmation
bewezen	proven
bewijs	evidence
bewijzen	proofs
biologie	biology
cijfers	figures
conclusie	conclusion
controle	control
controleren	checking
corona	coronavirus
covid	covid
data	data
deskundig	expert
economie	economy
empirisch	empirical
energie	energy
evidence based	evidence-based
exact	precise
experimenten	experiments
experimenteren	experimentation
feiten	facts
gebaseerd	based
gedegen	thorough
gegevens	data
geld	money
geleerden	scholars
geneeskunde	medicine
gezondheid	health
gezondheidszorg	healthcare
hoogleraren	professors
hypothese	hypothesis
ICT	IT
iets onderbouwd	something proven
industrie	industry
informatie	information
innovatie	innovation
integer	integrity
intelligentie	intelligence
interessant	interesting
kennis	knowledge

klimaat	climate
laboratoria	laboratories
laboratorium	laboratory
leven	life
logica	logic
maatschappelijk	societal
medicatie	medication
medicijnen	drugs
medische	medical
medische wetenschap	medical science
mensen	people
milieu	environment
nadenken	thinking
NASA	NASA
natuur	nature
natuurkunde	physics
nieuw	new
nieuwe dingen	new things
nieuwe ontwikkelingen	new developments
nieuwe technieken	new technologies
objectief	objective
objectiviteit	objectivity
onafhankelijk	independent
onderbouwing	substantiation
onderwerpen	subjects
onderwijs	education
onderzoek	research
onderzoeken	research
onderzoeker	researcher
ontdekken	discovering
ontdekking	discovery
ontdekkingen	discoveries
ontwikkelen	developing
ontwikkelen	develop
ontwikkeling	development
ontwikkelingen	developments
oplossingen	solutions
peer review	peer review
producten	products
proeven	tests
professor	professor
professoren	professors
publicatie	publication
resultaten	results
RIVM	RIVM
ruimte	space
ruimtevaart	aerospace
scheikunde	chemistry
slim	smart
slimme mensen	smart people
statistiek	statistics
studie	study

techniek	technology
technische	technical
technologie	technology
testen	testing
theoretisch	theoretical
theorie	theory
toekomst	future
toetsing	testing
uitvinden	discovering
uitvinding	invention
universitair	academic
universiteit	university
universiteiten	universities
vaccin	vaccines
vaccinatie	vaccination
verbetering	improvement
verbeteringen	improvements
vernieuwing	renewal
vooruitgang	progress
waarheid	truth
wereld	world
wetenschap	science
wetenschappelijke	scientific
wetenschapper	scientist
wiskunde	mathematics
zekerheid	certainty
ziekte	illness
zorg	care

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Cover photo

Virologist Marion Koopmans and intensivist Diederik Gommers (photo: Robin Utrecht/ANP)

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