EUROBAROMETER 55.2

Europeans, science And technology

December 2001

This opinion poll, managed and organised by the Directorate-General for Press and Communication, Public Opinion Sector, has been carried out at the request of the Directorate-General for Research.

It was conducted in all the Member States of the European Union between 10 May and 15 June 2001 under the general coordination of EORG, in Brussels.

The questionnaire, the names of the institutes associated with the research and the technical specifications are annexed.

The European Commission cannot in any way be held liable for this report.

This report was originally drafted in French.

INTRODUCTION

The opinion poll analysed in this report was carried out in the fifteen Member States between 10 May and 15 June 2001 as Eurobarometer[1] 55.2, at the request of the Public Opinion Sector.

This report looks at Europeans' experience and perception of science and technology. It is subdivided into several chapters covering:

- **Information, interest, knowledge**
- **Values, science, technology**
- **Responsibilities and accountability of scientists**
- **GMOs: an important issue**
- **Levels of confidence**
- **Young people and the scientific vocation crisis**
- **European scientific research.**

These questions were put to a representative sample of the national population aged 15 and over in each Member State. A total of 16 029 people were questioned, which averages out at some 1 000 people per Member State, except in Germany (1 000 in the new Länder and 1 000 in the former Länder), in the United Kingdom (1 000 in Great Britain and 300 in Northern Ireland) and in Luxembourg (600). Note that the figures given in this report for the European Union as a whole are a weighted average of the national figures.

For each Member State, the weighting used is the proportion of the national population aged 15 and over within the Community population aged 15 and over.[2] The annexed technical specifications give details of all the methodological questions such as survey dates, selection of the sample, population covered, weighting, confidence limits, and so on. We must clarify some of the terms used in these

1 The Eurobarometer surveys, or more exactly the "Eurobarometer standard reports" have been carried out since 1973 (EB N° 0) for the former Directorate-General X of the European Commission, now the Press and Communication Directorate-General. Since the autumn of 1980 they have included Greece, since the autumn of 1985 Portugal and Spain, since the autumn of 1990 East Germany and since spring 1995 Austria, Finland and Sweden.

2 See technical specifications in Annex.

technical specifications: marginal weighting is that which is based on one variable, such as age **or** sex, while intercellular weighting is based on the cross-referencing of two variables, such as age **and** sex. The NUTS regions are a classification of the regions of the European Union according to a three-level hierarchical structure. The Eurobarometer is weighted on the basis of the NUTS 2 regions.

It is also important to note that, whenever respondents were entitled to give several answers to the same question, the total percentages given in the graphs in the report and the tables in the annexes can add up to more than 100%.

Also, the totals may not always add up to exactly to 100%, but a number very close to it (such as 99% or 101%), because figures have been rounded.

The following abbreviations are used to designate the Member States:

B	Belgium
DK	Denmark
WD	Former Länder
D	Germany
OD	New Länder
GR	Greece
E	Spain
F	France
IRL	Ireland
I	Italy
L	Luxembourg
NL	Netherlands
A	Austria
P	Portugal
FIN	Finland
S	Sweden
UK	United Kingdom

A remark must be made concerning the separation of the former and new Länder of Germany, which was justified when East Germany was introduced into the list of countries covered by Eurobarometer in autumn 1990. Despite reunification, this distinction has been retained as it frequently highlights clear-cut differences of opinion between these two territories. The abbreviation used to designate the European Union as a whole is "EU15". The abbreviation "DNK" means "Don't know".

SUMMARY OF RESULTS

Information, interest, knowledge

- Europeans consider that they are often poorly informed about science and technology (so state two-thirds of them), although 45.3% declare that they are interested in this subject.
- The areas of greatest interest to Europeans are medicine and the environment while television remains the preferred medium for obtaining information on scientific developments. Visiting science and technology museums, on the other hand, remains a fairly uncommon experience (11.3%).
- The scientific knowledge of Europeans has evolved little since the last survey, with one single exception, concerning the action of antibiotics on viruses; in the 1992 survey, 27.1% of those asked knew that antibiotics were powerless against viruses, whereas 39.7% of the sample is now aware of this fact.
- Many Europeans feel that they grasp topical issues such as "mad cow disease" (76.6%) or the greenhouse effect (72.9%), while some technologies remain very obscure to the public (this is true of nanotechnologies, for instance).

Values, science, technology

- The European public perceives the consequences of scientific and technical development in a highly diverse way with scientific activities being credited for combating diseases, improving daily life and being of general interest. The overall view of science (i.e. the balance between its positive impact and harmful consequences) also remains positive.
- But science and technology are no longer considered a panacea for a series of problems, many of which need in fact to be addressed by other agencies, notably public social or environmental policies. Thus, the statement "*Science and technology will help to eliminate poverty and famine in the world"* did not meet with support (52% of people disagreed) and the notion "*thanks to scientific and technological progress, the natural resources of the earth will be inexhaustible*" was also rejected (61.3% disagreed).
- A very large majority of Europeans favours basic research primarily if it is aimed at developing "new technologies" (83.2%), but also if "it only helps knowledge to progress" (75.0%).

Responsibilities and accountability of scientists

- Europeans are very divided on the issue of scientists' responsibility. The statement *"Scientists are responsible for the misuse of their discoveries by others"* elicits almost as much agreement (42.8%) as disagreement (42.3%).
- The desire for some social control of science is nowadays very widespread in Europe since 80.3% of Europeans subscribe to the idea that "*the authorities should formally oblige scientists to observe ethical rules*". It is striking that this notion of constraint is to be found everywhere, even among people whom one would expect to trust scientists most, namely those with a high level of knowledge.
- The agri-food industry is most often considered to bear most of the blame for the mad cow affair: 74.3%. Next come politicians (68.6%), farmers (59.1%) and scientists (50.6%). Finally, 44.6% of respondents felt that they did not have enough information to say who was responsible.

GMOs: an important issue

- When it comes to GMOs, the most frequent attitude is the demand for choice and for information: 94.6% of Europeans want to have the right to choose when it comes to genetically modified foodstuffs.

  There are no exceptions to this demand which is very high within all the various sub-groups making up the sample.
- The second demand concerns information: 85.9% of respondents want "to know more about this kind of food before eating it".
- 59.4% of Europeans believe that GMOs may have negative effects on the environment, while 28.7% have no opinion on this.

Levels of confidence

- The three most highly regarded professions in Europe are those which have a scientific or technical dimension; doctors come first (chosen by 71.1% of respondents), followed by scientists (44.9%) and, thirdly, engineers (29.8%).
- In the case of a "disaster in your neighbourhood or district", the public places most trust in scientists (62.7%) and doctors (55.3%).
- Environmental protection and consumer protection organisations are also given a significant vote of confidence: 59.8% and 31.6% respectively.

Young people and the scientific vocation crisis

- The lack of interest on the part of young people in scientific studies and careers is attributed firstly to "the lack of appeal of scientific studies" (59.5%), next to the "difficulty of the subjects" (55.0%) and thirdly to the fact that "young people are not so interested in scientific subjects" (49.6%). Poor career prospects are also mentioned (42.4%), while only 29.9% of respondents agree that this lack of interest could be caused by science's poor image in society.
- Almost two-thirds of Europeans support the idea of active public policies in this area; 60.3% of them would in fact like "the authorities to try to remedy this situation".

European scientific research

- The European public has an imperfect knowledge of the areas covered by the EU:
  - The three areas mentioned by at least half of Europeans are agriculture (59.2%), international trade (53.5%) and the environment (50.7%).
  - These are followed by foreign affairs (44.6%), defence (41.5%), science and technology (38.2%) and energy (33.0%).
  - The other fields are mentioned by fewer than a third of the respondents, and include consumer protection (28.9%), employment and social affairs (28.8%) and, finally, regional development (22.4%).
- If we compare these perceptions with the wishes expressed by Europeans, we observe that most Europeans would like to step up the EU's involvement in four areas (consumer protection, employment and social affairs, energy and science).
- Europeans believe that the three measures most likely to improve the level of European research concern not the level of investment in science but rather the organisation of research: improving cooperation between European researchers (84.1%), coordinating research (80.4%) and improving cooperation between public research and industry (78.7%).
- For Europeans, the enlargement of the European Union to the east will above all be of benefit to the countries which are currently applicants; 62.7% of respondents believe that, as new members, their scientific potential will be

enhanced. But, for 53% of those questioned, the process will also benefit the current members.

1. INFORMATION, INTEREST, KNOWLEDGE

1.1. INFORMATION AND INTEREST ACCORDING TO AREAS

Table 1:

Perception of degree of information at European level

	Do you feel well or poorly informed about the following subjects? (% EU15)			**Are you rather interested or not very interested in each of the following subjects? (% EU 15)**		
Areas	**Well informed**	**Poorly informed**	**DNK**	**Rather interested**	**Not very interested**	**DNK**
Sport	57.0	40.5	2.6	54.3	44.7	1.0
Culture	48.5	47.0	4.6	56.9	40.8	2.3
Politics	44.3	52.2	3.5	41.3	57.0	1.7
Science and technology	33.4	61.4	5.2	45.3	52.2	2.4
Economics and finance	31.9	63.5	4.7	37.9	59.8	2.3

The survey tested to what extent people felt informed or were interested in five areas. As a whole, Europeans felt that they were best informed about sport (57%), with culture taking second place (48.5%) and politics third (44.3%). Roughly a third of Europeans believe themselves informed about science (33.4%) and economics (31.9%).

When it comes to interest, the ranking is not exactly the same; while sport and culture also inspire a strong degree of interest (54.3% and 56.9%), **this time, science is in third place (45.3%), before politics (41.3%) and economics (37.9%).**

As a general rule, interest in the subjects mentioned tends to increase with the age at which the person being asked finished studying. This tendency is even more marked in the case of science and technology; 30% of those who left school early (aged 15 years) say that they are interested in science as opposed to 61% of those who were still studying at the age of 20 and above.

Fewer women than men declare an interest in science (39.6% as opposed to 51.5%) and this disparity occurs whatever the age at which they finished studying.

The countries with the highest percentages of interest in science and technology are essentially those whose education systems produce the greatest number of graduates

from higher education, including Sweden (64.3% interested), Denmark (60.9%), the Netherlands (58.9%) and France (54.0%). Conversely, low rates of interest are recorded in countries such as Ireland (31.6%) or Portugal (37.9%).

Nevertheless, there are exceptions to the rule. Firstly, there is Greece, where the percentage of interest in science is particularly high (60.9%) and, in contrast, Germany, where only 29.8% of the sample stated that they were interested in science and technology. A similar result was observed in Germany in the previous survey: in 1992, 26.2% of Germans questioned stated that they were "highly interested in scientific discoveries", as against a European average of 37.6%.

In order to grasp the attitudes of Europeans to scientific information more closely, it is interesting to combine the two questions raised, firstly in terms of degree of information and the secondly in terms of interest (Table 2).

Table 2:

Information about and interest in science and technology

Informed and interested	29.1
Interested but not informed	14.7
Neither informed nor interested	45.8
Other	10.4

When combining these results we can see that a little less than one third of Europeans (29.1%) state that they are both well informed and interested in science and technology while, at the other extreme, 45.8% feel that they are neither informed nor interested. Finally, a not insignificant proportion (14.7%) seeks information, since these people declare that they are interested but not informed. It is noteworthy that this percentage is at its highest in Greece (25.5%).

Table 3:

Which scientific and technical developments do you find most interesting?

	B	DK	D tot.	GR	E	F	IRL	I	L	NL	A	P	FIN	S	UK tot.	EU 15
Medicine	56.9	41.8	55.8	67.3	60.7	69.5	37.1	76.3	71.8	54.3	61.9	66	48.3	56.2	46.1	60.3
Environment	52.1	32.6	48.1	56.3	56.3	58.6	38.6	58.8	65.8	51	51.9	36.6	50.6	55.2	42.9	51.6
The Internet	26.6	27	22.7	19.9	27.1	25.3	27.5	31.2	38.8	47.9	27.4	19.1	25.9	34.1	32	27.9
Genetics	18.5	19	18.2	22.4	18.7	33.3	9.9	26.3	28.5	27.3	18	10.5	18.3	22.2	18.7	22.2
Economics & social sciences	23.1	39.4	20.3	28.7	17.7	23.9	13	22.5	29.5	34.6	26.7	14.3	24.7	40.9	14.7	21.7
Astronomy & space	17.2	18.7	16.3	10.3	13.2	18.9	9.5	14.9	17.3	22	18.7	11.9	18.7	27.1	22.2	17.3
Nanotechnologies	4.5	5.3	3.1	3.7	2.7	5.1	1.1	4.4	6.2	6.6	5.8	2.9	3.8	4.3	3.2	3.9
None	11.7	1.5	9.5	7.3	12	6.3	19.9	4.2	1.1	8.7	11.6	8.8	4.7	3.2	13.8	8.8
DNK	1.7	0.2	3.5	0.3	2.3	0.8	8.4	0.4	0.8	1.5	0.9	5.1	2.8	0.9	4.2	2.3

Medicine (60.3%) and the environment (51.6%) are the two areas of greatest scientific interest to Europeans. The medical sector has always inspired keen interest in the public for obvious reasons. Interest is most marked in the case of women (68.4%) and the elderly (69.5% of those over 55 years of age). It is also more widespread in the countries of southern and central Europe (Italy, 76.3%, Luxembourg, 71.8%, France 69.5% and Greece 67.3%).

The environment is a relatively more recent concern, perceptions apparently having changed in the last few years; it seems that, for many Europeans nowadays, safeguarding the environment is now partly regarded as a public health issue. However, contrary to the case of medicine, the environment is also most often mentioned by those who have pursued lengthy studies.

Chosen by 27.9% of respondents, the Internet comes in third place. Certain northern countries, such as the Netherlands (47.9%), Luxembourg (38.8%) or Sweden (34.1%) stand out for claiming a greater degree of interest. **But the most salient feature of this option is its massive popularity among young people: 53.8% among the 15 to 24 year olds and those with the highest qualifications (37.8% of those who have studied beyond the age of 20).**

Genetics and economics and the social sciences achieve comparable ratings (22.2% and 21.7% respectively). It is interesting that genetics scores more frequently in France (33.3%), Luxembourg (28.5%) and the Netherlands (27.3%) and among senior executives (29.0%). Interest in the social sciences is much more widespread in two Nordic countries, Sweden (40.9%) and Denmark (39.4%).

1.3. SCIENTIFIC INFORMATION MEDIA

Table 4:

Sources of information on scientific developments are listed below. Please classify them in order of importance from 1 to 6 (total of marks 1 and 2)

	B	DK	D tot.	GR	E	F	IRL	I	L	NL	A	P	FIN	S	UK tot.	EU 15
TV	63.6	60.6	67.7	62.2	52.5	64.6	61	48.8	42.3	59.4	64.6	59.1	59.1	66.2	60.4	60.3
Press	37.3	39.3	43.9	30.1	25.8	34.7	39.1	28.1	29.5	49.2	41.2	22.8	50	46.4	42.2	37
Radio	29.7	22.7	25.5	33	33.6	33.7	39.6	15.9	24.4	35.7	41	28.3	21.4	24.6	25.6	27.3
School or university	24.8	27.9	14.2	28.7	24.7	17.4	20.5	34.3	19.1	26.9	14.3	19.1	26.6	23	22.9	22.3
Scientific journals	20.9	16.9	15.4	13.2	16.9	20.8	14.4	33.1	13.9	21.2	16.1	8.1	22.4	21.2	18.7	20.1
The Internet	18.4	15.8	13.7	10.4	13.5	9.5	20.3	23.7	14.3	23.3	16.4	13.7	18.3	14.1	22.8	16.7

To assess the use of the various media (TV, radio, written press, scientific journals, the Internet, school or university) conveying scientific information, the public were asked to classify them, giving each a "mark" of 1 (for the medium judged the most important) to 6 (for the least important).

Adding together the high marks (1 or 2) gave the following:

TV: 60.3%

Press: 37%

Radio: 27.3%

School or university: 22.3%

Scientific journals: 20.1%

The Internet: 16.7%

These preferences hardly vary from one country to another, though we observe less enthusiasm for television in Italy (48.8%) and a marked preference for the printed press in Finland, the Netherlands and Sweden (50%, 49.2% and 46.4% respectively).

On the other hand, there are pronounced differences in cultural practices according to the age and level of education of respondents.

- **While TV appears relatively universal** (although cultured groups evidently choose it less frequently or do not admit to watching it), elderly people are more likely to listen to the radio;
- **the best educated more often read the general press** (41.5%) and especially scientific journals (29.2%);
- **the youngest and those who are currently still studying prefer using the Internet** (29.1% and 33.1% respectively). Logically, these same categories also favour the school or university system (34.6% among 15-24 year olds and 39.3% among those still studying).

A series of five questions concerning attitudes to the various scientific information media confirm these results.

Table 5:

Attitudes with regard to the various scientific information media (% EU 15)

	Inclined to agree	**Inclined not to agree**	**DNK**
I prefer to watch television programmes on science and technology rather than read articles on this subject	66.4	23.8	9.9
I rarely read articles on science and technology	60.6	33.5	6.0
There are too many articles and programmes on science and technology	18.0	65.8	16.1
Scientific and technological developments are often presented too negatively	36.5	39.1	24.4
The majority of journalists treating scientific subjects do not have the necessary knowledge or training	53.3	20.0	26.7

The first observation is that two thirds of Europeans "prefer to watch television programmes on science and technology rather than read articles on this subject", which is an answer consistent with the overwhelming choice of television emphasised above. About the same number of respondents (60.6%) state that they "rarely read articles on science and technology". But this answer is given only by 48.6% of those who have undertaken lengthy studies (who left school or university after age 20). Despite this low proportion of declared readers, this does not imply that there are "too

many articles and programmes on science and technology", as this opinion is rejected by 65.8% of respondents and 75.9% of those who have pursued lengthy studies.

Finally, there were two questions regarding opinions on the quality of information provided by the media: 36.5% of Europeans think that "scientific and technical developments are presented too negatively" but a higher proportion (39.1%) disagrees. In addition, 53.3% believe that journalists treating scientific subjects do not have the necessary knowledge or training.

These two questions are linked with each other statistically.[3] Among those who find scientific information too pessimistic, 72.2% think that journalists lack scientific know-how.

Combining these two opinions indicates that a quarter of Europeans (23.6%) believe <u>both</u> that scientific information is too pessimistic and that journalists are poorly trained. This distrust of information does not vary according to the age when studies were completed. It is only slightly higher among those who define themselves both as "informed" about and "interested" in science (31.5%).

To complete these findings, two specific questions were raised concerning visits to museums.

[3] Cramer's V : 0.349.

Table 6:

Frequency of visits to science and technology museums in the last 12 months

Have you visited a science and technology museum in the last 12 months?	% EU 15
Yes, I have	17.8
No, I'm not interested	32.6
No, I don't have the time	29.2
No, it's too far	11.9
No, I do not know where such museums are	9.8
No, the entrance fee is too high	3.1
DNK	2.2

Table 7:

Types of establishments visited during the last 12 months (% EU 15)

	B	DK	D tot.	GR	E	F	IRL	I	L	NL	A	P	FIN	S	UK tot.	EU 15
None of those listed	47.6	16.9	4.,4	72.9	63.1	43.7	51	51.8	46.1	19.3	51.1	67.6	16.5	13.8	30.5	44.3
Public library	30.9	66.5	22.6	8.1	15.4	25.8	31.3	24.7	15.8	60.4	15.8	14.7	73.2	75.3	51.2	30.7
Zoo/aquarium	22.1	42.5	33.5	11.7	13.1	27.4	19.6	17.7	24.1	44.3	30.2	17.7	20.7	28.4	27.1	25.7
Art gallery	19.6	38.3	16.1	11.1	14	23.2	11.1	26.1	24.4	36.6	15.6	8	27.2	36.1	22.2	20.9
Science and technology museum	9.7	16.9	12.3	5.1	11.2	8	4.1	8.7	13.9	13.7	11.7	8.9	10.3	19.4	15.8	11.3
DNK	2.6	0.5	2.2	1.8	3.8	4.8	5.9	0.5	4.9	0.4	2.2	2	4	0.9	2.8	2.5

The first question is concerned with visits to scientific and technical museums in the previous twelve months and lists the possible reasons for not going to see them. The second question defines the concept of "museum" by listing various types of establishment (zoos, science museums, libraries, etc.).

- **Fewer than one European in five (17.8%) has recently visited a technical or scientific museum. Going to museums is a far more frequent activity among young people still studying (31.0%).**
- One third of Europeans (32.6%) admit that they are not interested in going to museums, while 29.2% say they cannot because of "a lack of time" or "they are too far away" (11.9%).

If we analyse the replies to the second question, which differentiates between the types of establishments visited, it appears that far fewer people go to science museums (11.3%)[4] than to libraries (30.7%), zoos and aquariums (25.7%), or even art galleries (20.9%).

The cultural practices reported of course vary according to the level of education of respondents but with differences according to the type of establishment considered:

- In the case of libraries or art galleries, there is a gap of approximately 25 points between the best educated (those who stopped studying aged 20 or over) and those who are least educated: 42.7% as opposed to 17.9%, for example, in the case of going to libraries.
- With regard to science and technology museums, on the other hand, the gap between the two cultural groups is smaller: 18.3% of the best educated go to these places as opposed to 5.9% of those who left school at the age of 15 or younger.

There are also certain significant differences between countries: the Dutch, Danes and Swedes report that they go to these kinds of establishments much more often (but in these cases, too, the gap concerns above all non-scientific establishments). Conversely, in Spain, Greece and Portugal the totally negative answer ("None of these places") is given much more frequently.

1.4. KNOWLEDGE OF SCIENCE

The question of testing the public's knowledge of science was tackled in several ways. The first method was to offer those interviewed a list of disciplines asking them to indicate which they believed to be "rather scientific".

[4] The difference in percentage given to the previous question (17.8%) is due to the fact that the notion of a science museum is not perfectly clear to the persons being questioned; some of those who stated that they had visited a science museum in reply to the previous question now answer that they have been to a zoo or an aquarium or to other kinds of establishment.

Table 8:

Defining boundaries between science and non-science (% EU 15)

For each of the following disciplines, please indicate whether it appears to you	Rather scientific	Not very scientific	DNK
Medicine	92.6	4.5	2.9
Physics	89.5	6.1	4.4
Biology	88.2	6.0	5.8
Astronomy	77.9	14,6	7.5
Mathematics	72.3	21.8	5.9
Psychology	64.5	28.2	7.3
Astrology	52.7	38.9	8.4
Economics	42,3	49.7	8.0
History	33,1	60.5	6.4

Europeans' answers on defining the boundaries between scientific and non-scientific subjects make it possible to define two groups comprising the major sciences on the one hand and the minor sciences on the other.

- The first group comprises, with the positive replies in ascending order, medicine (92.6 %), physics (89.5 %), biology (88.2 %), astronomy (77.9 %) and mathematics (72.3 %).
- The second group includes psychology (64.5 %), astrology (52.7 %), economics (42.3 %) and history (33.1 %).

It is interesting to note that medicine leads the way within the first category, while biology, a science whose successes are relatively recent, is practically on the same level as physics, which had dominated the scientific landscape in the post-war period, and astronomy rates much lower (could it be that it is regarded as an outdated science?).

Among the disciplines featuring in the second group, the support for psychology (64.5 %) is striking while, on the contrary, so is the low score of economics (42.3 %) and above all history (33.1 %). Another finding of note is the continually surprising position accorded to astrology, which the majority of Europeans (52.7 % as opposed to 38.9 %) continue to include among the sciences.

These assessments vary according to cultural differences, the general rule being that, for all the disciplines referred to, with the exception of astrology, positive answers ("it is a science") are more frequent the higher the age at which the respondent finished studying. Astrology is the exception to this rule but, as can be seen in Table 9, this exception is not remarkable since, about one respondent in two, even among those who have pursued lengthy studies, claims that astrology has a scientific character and, among those who are still studying, the percentages of replies are higher than the average.

Table 9:

Judgments on the scientific character of astrology according to the age when studies were finished

Age when studies finished	Astrology is a science
Up to 15 years of age	50.5
16 - 19 years of age	55.1
20 years of age and over	49.8
Still studying	55.3
Average	52.7

The opinions regarding the major sciences do not vary very much in the different countries of the EU, but there are striking differences of opinion regarding the social sciences such as economics, psychology and, above all, history; generally speaking, these disciplines are less often considered "scientific" in France, Spain and Italy.

A second aspect of the link to scientific knowledge was tested in the form of a quiz, namely a list of assertions objectively true or false about which the public were asked to give an opinion.

Table 10:

Please indicate whether the following statements are true or false. (% EU 15)	True	False	DNK
Lasers function by making sound waves converge	26.6	35.3	38.1
Antibiotics kill viruses as well as bacteria	41.3	39.7	19.0
Electrons are smaller than atoms	41.3	23	35.7
The genes of the father determine whether a baby is a boy or a girl	48.1	30.2	21.6
All radioactivity is manmade	26.5	52.6	20.9
The Earth goes around the Sun in a month	22.9	56.3	20.9
The first human beings lived at the same time as the dinosaurs	20.3	59.4	20.3
Radioactive milk can be made healthy by boiling it	11.8	64.2	24.0
The Sun turns around the Earth	26.1	66.8	7.1
Human beings have evolved from older animal species	68.6	16.6	14.8
The oxygen that we breathe comes from plants	79.7	13.6	6.7
The continents have been moving for millions of years and will continue to move in the future	81.8	5.5	12.7
The Earth's core is very hot	88.4	3.5	8.1

We may classify the true or false opinions into three categories:

- propositions for which less than one European in two gives the right answer: how lasers function (35.3 % of correct answers), the effectiveness of antibiotics against viruses (39.7 %), the relative size of electrons to atoms (41.3%) and the determining of the sex of an unborn child by the father's genes (48.1%);

- propositions of medium difficulty for which the percentages of correct answers range from about one in two to just over two-thirds: the nature of radioactivity (52.6%), the rotation time of the Earth around the Sun (56.3%), the co-existence of the first humans with the dinosaurs (59.4%) and the effect to be expected from boiling radioactive milk (64.2%);

- finally, a series of assertions are very correctly judged by the European public, such as the Earth's revolution around the Sun (66.8%), the "animal" origins of man (68.6%), the origin of oxygen (79.7%), continental drift (81.8%) and the earth's hot core (88.4%).

A comparison with the data collected during the previous survey does not highlight any major differences,[5] with two exceptions:

- in the 1992 survey, 49.9% of those questioned recognised that the statement "the first human beings lived at the same time as the dinosaurs" was false, whereas nowadays 59.4% gave this answer. Could it be that the large number of documentaries and fictional items on these topics in recent years has helped to clarify people's knowledge?

- 27.1% of persons asked in 1992 thought that the statement "antibiotics kill viruses as well as bacteria" was false, whereas nowadays this notion is recognised as false by 39.7% of the sample. This increase in knowledge is probably due to the fact that discussions on the problems of using antibiotics, such as new forms of resistance, the risks of treating benign illnesses with antibiotics, etc., have proliferated in Europe.

To analyse variations within the sample, it is useful to devise a "knowledge index" which computes the correct answers and thus ranges from 0 to 13. The average of this index is 7.8 and the breakdown is as follows:

5 Comparing only the questions for which the formulation was strictly identical.

Table 11:

Percentages of marks on the knowledge index

Mark	%
0	0.8
1	0.9
2	1.8
3	3.5
4	5.0
5	8.7
6	11.1
7	12.2
8	12.9
9	12.9
10	11.0
11	10.0
12	5.8
13	2.7
Total	100.0

If this index is calculated according to the ages at which people finished studying, the correlation between education and scientific knowledge is clearly demonstrated.

Table 12:

Knowledge index according to age when studies finished

Age when studies finished	Average knowledge index
Up to 15	6.4
16 - 19	7.9
20 and above	9.0
Still studying	9.0
Average	7.8

Finally, a comparison of this index in the various countries of the EU reveals which countries on average are better informed; this is particularly true of the countries of northern Europe such as Sweden, the Netherlands, Finland, Denmark, and those where the level of scientific information is lower (Portugal, Ireland, Greece and Spain).

Beyond the question of knowledge itself, one might also wonder to what extent the public perceives certain rules of scientific method in a more or less clear way. To assess this new kind of knowledge, two questions were formulated:

Table 13:

Perception of scientific methods

Imagine that a scientist wants to know whether a particular medicine is effective in combating a disease for which there is no prevention, diagnosis or treatment. In your opinion, which is the more correct scientific approach to test the effectiveness of the medicine?

1. Administering this medicine to 1 000 people suffering from this disease to see how many show signs of recovery.
2. Administering this medicine to 500 people suffering from this disease and asking another 500 people not to follow the treatment to see which of the two groups contains more people showing signs of recovery.
3 Administering this medicine to half of the people and treating the other 500 with a placebo which is harmless but looks is identical in order to see which of the two groups contains more people showing signs of recovery.
4. DNK

	B	DK	D tot.	GR	E	F	IRL	I	L	NL	A	P	FIN	S	UK tot.	EU 15
1.	17.5	10.6	17.0	20.0	20.9	16.4	12.1	28.9	18.6	7.	23.2	14.3	9.	8.6	11.	17.
2.	23.1	19.2	30.2	34.1	28.7	22.8	27.4	24.9	19.2	17.3	19.4	32.6	17.2	14.5	24.9	25.7
3.	40.5	63.6	28.2	27.9	27.4	45.8	34.7	24.6	35.4	63.5	36.5	30.2	55.9	70.3	44.6	36.7
4.	14.7	5.0	19.5	14.7	19.1	12.7	25.4	17.2	18.1	7.9	19.4	20.5	13.6	4.0	17.3	16.4

Table 14:

Perception of scientific methods

Suppose doctors tell a couple that their genetic material is such that they have one chance in four of having a child affected by a hereditary illness. Does this mean…?

1. If they have only three children, none will have the illness
2. If their first child has the illness, the next three will not
3. Each of their children has the same risk of having the illness
4. If their first three children do not have the illness, the fourth will
5. DNK

	B	DK	D tot.	GR	E	F	IRL	I	L	NL	A	P	FIN	S	UK tot.	EU 15
1.	3.9	3.0	2.1	4.4	2.2	1.7	2.3	2.1	1.5	1.3	7.	3.6	2.0	1.4	2.8	2.4
2.	7.6	3.5	7.1	10.1	4.8	6.3	4.9	5.6	4.2	3.7	8.7	9.4	4.0	5.1	6.2	6.3
3.	68.7	82.3	66.4	59.4	66.1	67.9	67.2	67.7	73.5	84.2	56.9	53.5	80.8	81.9	73.1	68.7
4.	6.2	4.6	6.3	7.8	7.4	5.2	4.2	6.4	7.8	3.6	4.1	9.6	3.4	2.1	3.6	5.6
5.	13.6	6.5	18.1	18.4	19.5	18.9	21.4	18.2	13.0	7.2	23.3	23.9	9.8	9.5	14.3	17.0

For the first of these two questions, the correct answer (the administration of the medicine to one group and a placebo to the other) is only identified by 36.7% of Europeans. To the second question, on the other hand, perhaps because it is more concrete, 68.7% of respondents give the correct answer.

The answers to these two questions once again reveal that some of the northern European countries have a better grasp of the scientific method (Denmark, Netherlands, Finland, Sweden). The same is true for people who have completed lengthy studies.

Finally, there is a very clear correlation between the level of knowledge revealed by the index devised above (the answers to the quiz) and a correct grasp of some elements of the scientific method. For example, among those giving 11 to 13 correct answers to the series of questions on knowledge, 58.9% (as opposed to 36.7% on average) also give a correct answer to the first question concerning scientific method (the administration of a medicine) and 87.9% (average 68.7%) to the second (the example of a hereditary disease).

A list of topical scientific subjects was also shown to interviewees who were asked to estimate how far they understood them or not.

Table 15: Avowed comprehension

Could you tell me whether you have the impression that you understand each of these topics of not? (% EU 15)	**I think I understand**	**I don't think I understand**	**DNK**
Air pollution	85.3	12.1	2.6
Mad cow disease	76.6	18.8	4.6
The greenhouse effect	72.9	22.4	4.8
Holes in the ozone layer	72.6	23.1	4.2
Global warming	72.3	23.4	4.3
Genetically modified food	59.3	34.8	5.8
The Internet	58.0	35.7	6.2
Medicines developed through genetic engineering	43.5	47.6	8.9
Fuel cell engines	32.7	57.3	10.0
Nanotechnologies	13.8	67.1	19.1

At least 70% of Europeans believe they understand five topics: pollution (85.3%), mad cow disease (76.6%), the greenhouse effect (72.9%), holes in the ozone layer (72.6 %) and global warming (72.3%).

Genetically modified food and the Internet come in second place (59.3% and 58.0% respectively), while, finally, three types of technique are less frequently understood: medicines developed from genetic engineering (43.5%), fuel cells (32.7%), and - in clear last place - nanotechnologies (13.8%).

If for the ten topics proposed we compute the number of replies indicating some comprehension, we obtain an average of 5.9. This average varies according to socio-demographic group: it is for instance 6.7 among those who pursued their studies beyond the age of 20. Here too, the replies claiming comprehension are more frequent in Denmark (7.0), the Netherlands (6.8), Sweden (6.6), but also in Greece (6.7).

This question of "avowed" comprehension was followed by a second series of propositions, also regarding subjects which are scientifically topical but which, unlike the previous series, are once again a test of knowledge.

Table 16:

Knowledge and perception of topical scientific subjects

In your opinion, are the following statements true or false? (% EU 15)	True	False	DNK
Holes in the ozone layer will cause more storms and tornadoes	55.7	22.7	21.6
The greenhouse effect can make the sea level rise	74.7	8.9	16.4
Genetically modified food (GMO) is dangerous	56.4	17.1	26.5
Mad cow disease (bovine spongiform encephalopathy) is due to the addition of hormones in cattle feed	49.2	32.1	18.7
Science and technology are going to improve agriculture and food production	59	20.7	20.3
Mad cow disease presents no danger to man	14.6	78.3	7.1
The rays of the sun can be both good for and dangerous to health	87.5	7.2	5.3

The first two questions of this series concern the greenhouse effect: 55.7% of persons asked believe - incorrectly - that holes in the ozone layer will cause more storms and tornadoes. This belief is a little less widespread, but still held by a majority of those who have pursued lengthy studies (52.6%) and especially among Europeans with a high level of scientific knowledge: 46.7% among those who have 11 to 13 correct answers on the knowledge index. Once again, correct answers are more common in some northern European countries, such as the Netherlands (only 27% of "true" answers to 53.1% of "false" answers).

If we compare with the avowed level of information regarding the previous question we observe that those who think they understand "holes in the ozone layer" do not give a correct answer more often concerning the supposed effect of these holes on the climate (58.7% of "true" answers).

Three-quarters of the Europeans asked believe that the sea level could rise as one of the physical effects of the greenhouse effect. This proportion rises to 84.0% among those who replied to the previous question that they understood the "greenhouse effect". It is also greater among those who are best educated (80.1%), even more so among those who demonstrate a high level of knowledge (89%).

As to whether "GMO-based food is dangerous", this is an open question for more than a quarter of Europeans (26.5% of don't knows). But quite a large majority (56.4%) believes however that this proposition is true, as opposed to 17.1% who don't. In this case, those who claim they are informed about the various techniques differ little from

those who admit their ignorance: 59.9% of the former believe that GMOs are dangerous as opposed to 53.2% of the latter.

As an indication that what is at stake with GMOs is very specific, **the feeling of danger varies only slightly according to the level of studies or knowledge of the persons questioned.** 58.0% of those who left school aged 15 or under answered negatively, whereas this figure was 53.2% among those who had studied beyond age 20. This answer also varies from 47.6% for the lowest level of knowledge to 51.0% for the highest level (Table 17).

Table 17:

Perception of the danger of GMOs according to level of knowledge

Knowledge index	True	False	Don't know
0 to 4	47.6	8.0	44.4
5 to 6	59.8	12.0	28.3
7 to 8	61.1	17.0	21.9
9 to 10	57.4	19.7	22.9
11 to 13	51.0	25.1	24.0
Total	56.4	17.1	26.5

Mad cow disease is incorrectly attributed to "the addition of hormones in cattle feed" by 49.2% of Europeans. This proportion of incorrect answers drops sharply according to the age when respondents finished studying or their level of knowledge; among those with the highest level on the knowledge index, 32% approve this proposition and 56.9% believe it to be false. Danish, Finnish and Swedish respondents give the right answer much more often. On the other hand, those who believe that they understand "mad cow disease" once again do not give the correct answer more often.

The belief that "science and technology are going to improve agriculture" is shared by 59.0% of Europeans. This belief is very widely held among the European public.

A large majority of Europeans (78.3%) refuse to believe that mad cow disease would not be a threat to man. This proportion is even higher among those who have pursued lengthy studies (85.9%) or who have a high level of knowledge (87.2%).

Finally, 87.5% of the sample subscribes to the idea that the sun's rays may be both beneficial and dangerous, without any significant variations being observed in the percentages of these answers.

2. VALUES, SCIENCE, TECHNOLOGY

2.1. OPTIMISM REGARDING SCIENCE

A series of questions was formulated on the general theme of the promises of science and technology. These questions are listed in Table 18 in a decreasing order of percentages of replies indicating confidence in scientific and technical development.

Table 18:

Could you tell me whether or not you agree with each of the following statements...?	**Inclined to agree**	**Inclined not to agree**	**DNK**
Scientific and technological progress will help to cure diseases such as Aids, cancer, etc.	80.5	9.1	10.4
Thanks to science and technology, there will be greater opportunities for future generations	72.4	13.6	14.1
Science and technology make our lives healthier, easier and more comfortable	70.7	19.9	9.4
The application of science and new technologies will make work more interesting	62.4	19.7	17.9
Science and technology cannot really play a role in improving the environment	28.0	58.8	13.2
The benefits of science are greater than the harmful effects it could have	50.4	24.2	25.4
New inventions will always be found to neutralise the harmful consequences of scientific and technological development	48.7	27.9	23.4
Science and technology will help to eradicate poverty and famine in the world	30.4	52.0	17.6
All things considered, computers and automation in factories will create more jobs than they eliminate	28.1	54.1	17.8
Thanks to scientific and technological progress, the earth's natural resources will be inexhaustible	21.4	61.3	17.2
Science and technology can solve all problems	16.5	72.8	10.7

Science's primary promise, which is the most widely subscribed to by the European public, deals with curing diseases such as cancer or Aids and is supported by 80.5% of Europeans. It is also widely believed that science and technology "will give greater opportunities to future generations" (72.4%). Many agree that science and technology "make our lives healthier, easier and more comfortable" (70.7%) and increase interest at work (62.4%). A majority of those asked also disagreed with the statement "science and technology cannot play a role in improving the environment" (58.8%).

But the notion that "the benefits of science are greater than its harmful effects" is avowed by only a small majority of Europeans (50.4%), while a quarter hold the contrary opinion and a further quarter have no opinion. What is more, if we compare this with the results obtained in 1992, **the overall view of the results of science has deteriorated**: in the previous survey, 61.2% of those interviewed felt that the benefits of science outweighed its negative effects, as opposed to 50.4% today.

The percentages of answers to the question "they will always find new inventions to neutralise the harmful consequences of scientific and technical development" are quite close to those of the preceding question, with 48.7% agreeing, 27.9% disagreeing and 23.4% "don't knows".

With the next series of opinions, we come to propositions not supported by the public. Science and technology "will not help to eradicate poverty" (52.0%), "automation will not create more jobs than it gets rid of in the long term" (54.1%),[6] science and technology "will not ensure that the earth's natural resources are inexhaustible" (61.3%) and, finally, it is not true that science and technology "can solve all problems" (72.8%).

We must distinguish, therefore, between three sub-groups of propositions; combating diseases, improving daily life and interest at work are still broadly attributed to scientific progress. The overall view of science (namely the balance between its positive effects and harmful consequences) still remains positive.

But it is now no longer considered possible that science and technology can be a panacea for a series of problems, a large part of which need in fact to be addressed by other agencies, and in particular by public social or environmental policies.

An analysis of the variations in replies to these questions according to cultural level confirms this interpretation. For some of these propositions, namely those which pertain to the natural fields of action of science (diseases, daily life, the environment), **the replies are all the more positive if the cultural level or degree of knowledge is high.** The same is true for the overall view of scientific activity (with some less

6 This opinion was, however, more widespread in 1992, scoring 73.4%.

marked variations nevertheless). **On the other hand, the notion that science is all-powerful is more likely to be rejected if the interviewee's cultural level is high.** These findings are illustrated in graph 1, which features the percentages of agreement with the eleven propositions in question according to level of scientific knowledge. It may be observed that:

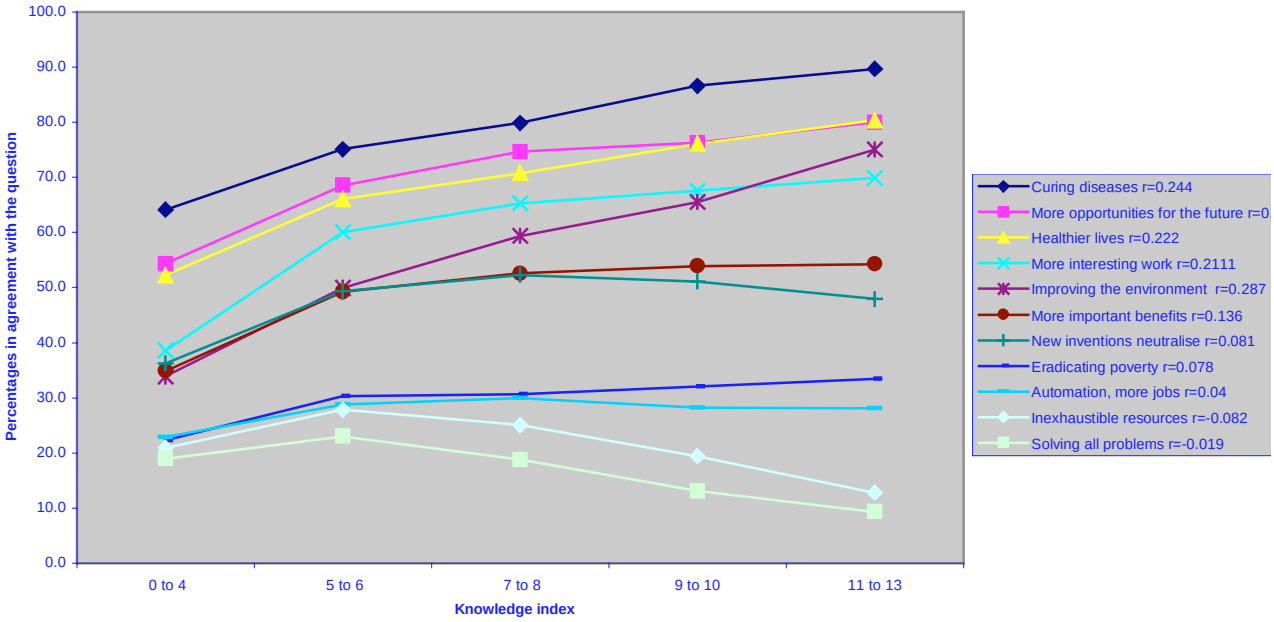
- for the first series of propositions (diseases, daily life, the environment), agreement is more frequent when the level of knowledge is high;[7]
- for the overall view of scientific activity, the ratios are still positive, but less significant;[8]
- for the last four propositions, on the other hand (eradicating poverty, automation will create more jobs, resources are inexhaustible, science will solve all problems), the correlations with knowledge level are very low or negative,[9] thus indicating that the higher their level of knowledge is, the more the interviewees disagree with the proposition.

7 The correlation coefficients between knowledge and opinions (Pearson's *r)* indicated in graph 1 range from 0.287 to 0.211.

8 0.136 and 0.081 respectively.

9 0.078, 0.04, -0.082 and –0.019 respectively.

Graph 1: Opinions about science according to level of knowledge



This analysis is also confirmed by the variations observed within the various countries of the EU. For example,

- to the question "thanks to science there will be greater opportunities for future generations" (average answer 72.4%), the countries characterised by the highest cultural levels give the most positive answers, namely the Netherlands, 84.3%, Denmark 89.8%, Sweden 83.0%;
- conversely, in these same countries, the idea that "science and technology can solve all problems" is most often rejected (average disagreement: 72.8%), with 90.3% in Denmark, 86.6% in the Netherlands and 95.5% in Sweden;
- the highest level of support for faith in science is encountered in Greece (37.4% agree, against an average of 16.5%).

Table 19:

For each of the following statements, would you say whether you are ... (% EU 15)	Inclined to agree	Inclined not to agree	DNK
Science and technology play an important role in industrial development	84.4	6.1	9.5
Basic scientific research is essential for the development of new technologies	83.2	5.0	11.8
Even if it does not yield immediate benefits, scientific research helps knowledge to progress and is necessary and ought to be supported by the government	75.0	10.4	14.6
Our economy can only become more competitive if we use the most advanced technologies	63.6	16.6	19.8
The Internet is essential for the development of new economic activities	56.2	21.5	22.3
The Internet will improve the quality of life	39.4	38.3	22.3
Scientific research does not make industrial products cheaper	52.4	26.7	20.9
Many high-tech products are only gadgets	51.5	25.7	22.8

This second series of questions concerns attitudes with regard to basic research and its industrial applications.

Two questions focused primarily on the appreciation of basic research. The results show that a very large majority of Europeans appreciate basic research for the development of "new technologies" (83.2%) and also, but to a lesser extent, because it helps "knowledge progress" (75.0%).

More generally, there is very widespread agreement with the opinion that science and technology "play an important role in industrial development" (84.4%). Approximately two-thirds of the sample (63.6%) also subscribe to the idea that it is necessary "to use the most advanced technologies to make the economy more competitive" (but in this instance the rate of "don't knows" is quite high: 19.8%).

Among the new technologies likely to have positive consequences, opinions regarding the Internet were tested from two angles, firstly its effects on new economic activities and secondly its ability to "improve the quality of life". There was quite widespread agreement on the first point (economic effects) (56.2%). On the other hand, there was little credence in the belief that the Internet could have a positive impact on the quality of life (39.4% agree, 38.3% disagree and 22.3% were "don't knows"). This opinion is however held a little more frequently by those who have pursued lengthy

studies (43.5%) and above all by the young, namely 60.1% of young men aged between 15 and 24.

The two opinions placed last in the list are distinguished by being formulated in "negative" terms ("scientific research does not make industrial products cheaper" and "many high-tech products are only gadgets"). As far as disagreement with these two opinions is concerned, the first met with 26.7% and the second 25.7%. In both cases the percentages of "don't knows" are also quite high (20.9% and 22.8% respectively).

Like its predecessor, Graph 2 summarises the statistical correlations between level of knowledge and the series of opinions concerning basic and applied research. This indicates that a high level of knowledge is often accompanied by greater confidence in the benefits of research. This is borne out in particular for all the aspects concerning the role of basic research or the expected benefits in terms of competitiveness. The opinion on the ability of the Internet to improve the quality of life, on the other hand, is hardly correlated to the level of knowledge.

Graph 2: Opinions on research according to level of knowledge

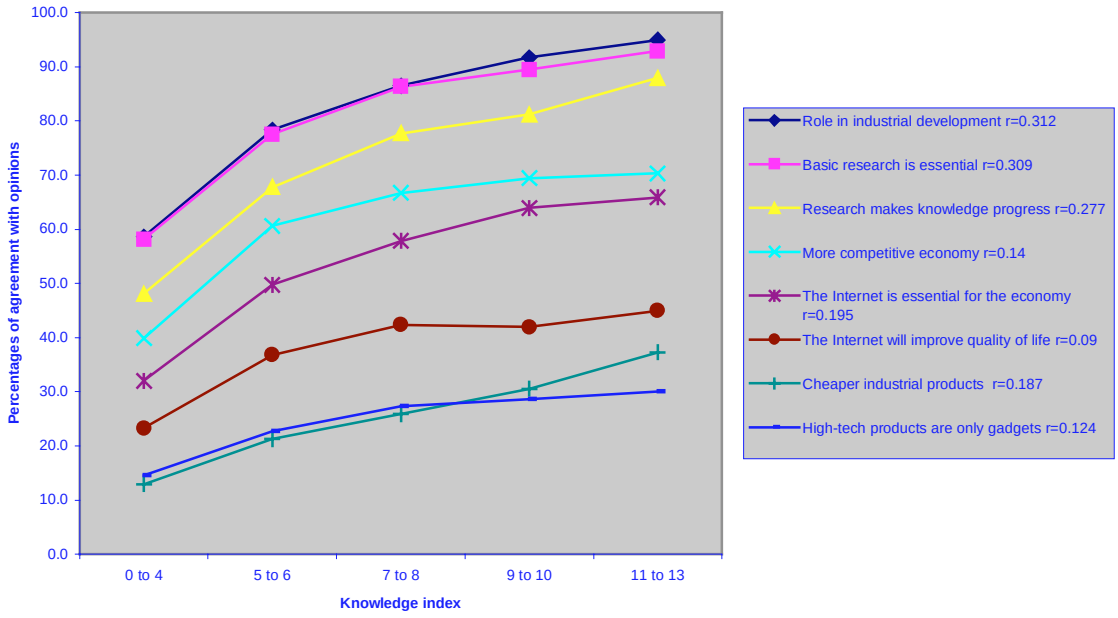


Table 20:

For each of the following statements, would you say that you were … (% EU 15)	Inclined to agree	Inclined not to agree	DNK
We put too much trust in science and not enough in faith	45.4	36.7	17.9
Science is changing our ways of life too quickly	61.3	27.5	11.2
Some numbers are particularly lucky for some people	46.1	35.8	18.1

The feeling that "we put too much trust in science and not enough in faith" is shared by 45.4% of Europeans. This opinion may be linked to another which states "science is changing our ways of life too quickly" (61.3% of respondents) as there is a strong statistical correlation between these two opinions.[10] These two statements, which seem to betray a feeling of fear or mistrust with regard to scientific and technical development, yield similar response structures; generally speaking, older people with fewer qualifications and a low level of scientific knowledge tend to subscribe to these opinions more frequently. For instance, for the first of these two propositions, rejection rises from 20.7% to 51.4% in proportion to the level of knowledge possessed and for the second from 15.7% to 40.9%.

We can to some extent compare these opinions[11] with those expressed through the following question: "Some numbers are particularly lucky for some people" to which 46.1% of those asked agree (as opposed to 35.8% who do not believe this). In this instance, once again, the degree of knowledge criterion reveals significant disparities in the rejection of this belief: from 18.7% for those who score between 0 and 4 correct answers on the knowledge index, disagreement goes up to 51.6% for those with the maximum marks (11 to 13).

10 X^2 significant at the threshold of 0.000, Cramer's V: 0.29.

11 There are significant correlations between the opinion that "We should put much more trust in faith" and the belief in "lucky numbers" (Cramer's V 0.177) and between the feeling that science "is changing our ways of life too quickly" and the same belief in "lucky numbers" (Cramer's V 0.183).

3. RESPONSIBILITIES AND ACCOUNTABILITY OF SCIENTISTS

Table 21:

For each of the following statements, would you say whether you are…? (% EU 15)	Inclined to agree	Inclined not to agree	DNK
As members of society, scientists share in the responsibility of any use - whether good or bad - of their discoveries	69.1	18.4	12.5
Scientists are responsible for the misuse of their discoveries by others	42.8	42.3	14.8
Scientists' knowledge gives them a power which makes them dangerous	63.2	24.8	12
A discovery in itself is neither good nor bad, what is important is the use which is made of it	84.4	8.1	7.5
Scientists should be allowed to carry out experiments on animals such as dogs and monkeys if that can help solve human health problems	45.4	41.3	13.3
The authorities ought to formally oblige scientists to observe ethical rules	80.3	8.3	11.3
Scientists ought to be free to pursue their research as they wish so long as they observe ethical rules	73.5	14.7	11.8

Are scientists responsible for the potentially negative consequences of their discoveries? This idea was tested with two formulations. The first, very general, attributes a share of responsibility to them "as members of society". More than two thirds of respondents (69.1%) agree with this opinion, more or less equally in all social and cultural groups. The second formulation involves scientists more directly since it presupposes their responsibility for the "misuse of their discoveries by others". In response to this formulation, the European public is almost divided into two blocks, one for and one against, of practically equivalent size (42.8% as opposed to 42.3%). But the gulfs between the cultural groups are more pronounced on this occasion: 60.5% of respondents with a higher level of knowledge (11 to 13) disagree with this opinion. Neither are perceptions the same in the various Member States of the EU; for example, 70.1% of Greeks agree with the statement that scientists are responsible, in contrast to only 30.8% of Danes, 29.6% of Finns and 21.9% of Swedes.

It is interesting to compare these perceptions of scientific responsibility with another question evoking the potential threat from the connection between science and power ("scientists' knowledge gives them a power which makes them dangerous"), an

opinion endorsed by 63.2% of Europeans. And we can see that there are statistical correlations between these two questions: among those who believe that scientists are potentially dangerous, 50.2% (as opposed to 42.8% on average) hold them responsible even for misuse of their discoveries by others.

A third way of viewing the responsibility of scientists is, on the contrary, to disavow it by subscribing to the idea that a scientific discovery is neither a good or bad thing in itself and that what matters is the use made of it. This idea is very widely held by Europeans: 84.4% agree with it, 87.5% of those who have pursued lengthy studies and 90.7% of those with a high level of knowledge (from 11 to 13).

On the other hand, Europeans are more divided over the question of whether or not to allow scientists to "conduct experiments on animals". 45.4% agree with this proposition while 41.3% disapprove. The analysis shows that this attitude is only very slightly correlated to the degree of scientific knowledge possessed.[12] Men are more likely to accept experiments on animals (50.6% agree with the question) and the same is true of those who place themselves on the right of the political spectrum (55.4% for positions 9 or 10).

In a broader sense, the degree of control of the freedom of scientists with regard to ethical rules was measured on the basis of two questions, the first implying a powerful notion of constraint since it states that "The authorities should formally oblige scientists to observe ethical rules", while the second confines itself to a type of control after the fact since it suggests that scientists "ought to be free to pursue the research that they wish so long as they observe ethical rules". As soon as it is a question of ethics, it would appear that the idea of a powerful constraint is uppermost in people's minds nowadays, as 80.3% approve the first formulation and 73.5% the second.
In this case, we can see practically no difference according to social or cultural group. **The notion of constraint is advocated everywhere, even among those whom we expected to have more trust in scientists, such as those with a high level of knowledge. On the contrary, in this group (11 to 13 points on the knowledge**

12 Among those with a high level, 48.1% agree with this proposition, as against an average of 45.4%.

index) we observe that 85.0% of respondents consider that the formal control of ethical rules is legitimate.

Finally, this idea is almost equally widespread whichever the country concerned.

Table 22:

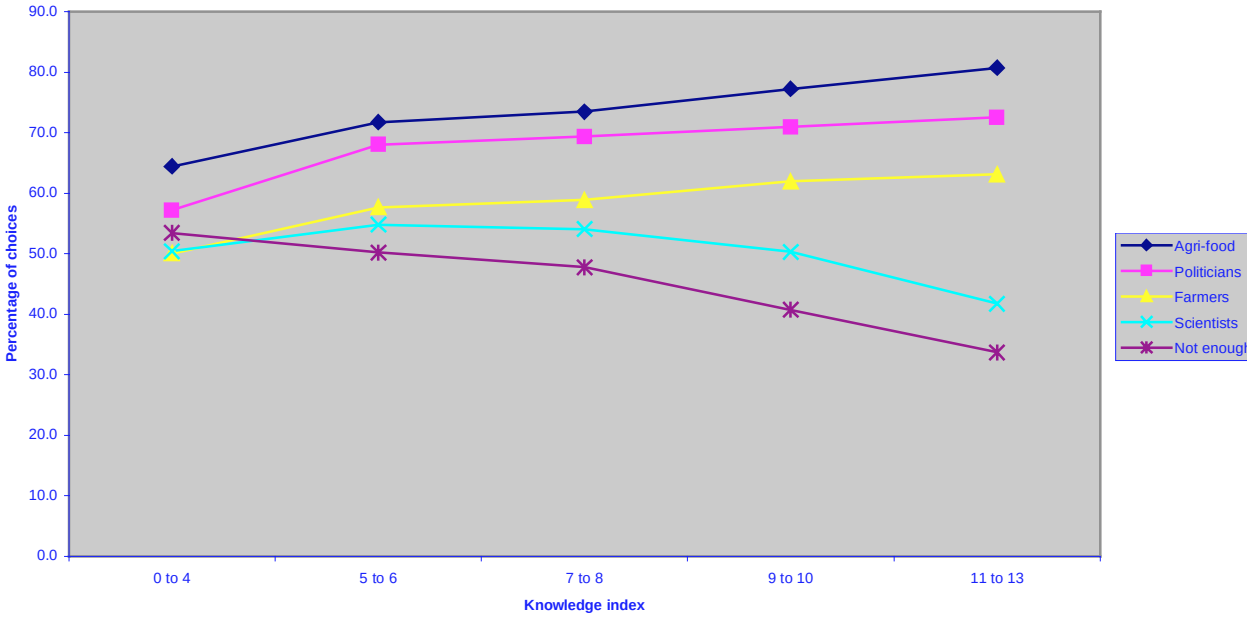
Concerning the question of responsibilities in the mad cow disease affair, would you say you were…? (% EU 15)	**Inclined to agree**	**Inclined not to agree**	**DNK**
The agri-food industry bears a great deal of responsibility in this affair	74.3	13.2	12.4
Politicians bear a great deal of responsibility in this affair	68.6	18.4	13.0
Farmers bear a great deal of responsibility in this affair	59.1	28.3	12.6
Scientists bear a great deal of responsibility in this affair	50,6	33.3	16.1
I do not have enough information to say who is responsible	44.6	38.9	16.5

The issue of the responsibility of the various players in scientific or technical innovation was tested on a very widely publicised subject, the BSE crisis.

The agri-food industry is most frequently cited as having a large share of responsibility in the mad cow disease problem (74.3%). Next come politicians (68.6%), farmers (59.1%) and scientists (50.6%). Finally, 44.6% of those asked felt that they did "not have enough information to say who is responsible".

Variations in these replies depending on knowledge level are revealing: **the higher the level, the greater the feeling that the industry, politicians and farmers are responsible, while the share of responsibility ascribed to scientists and the feeling that information is lacking both decline (Graph 3).**

Graph 3: Responsibilities in the mad cow disease affair according to knowledge index



Following this question on the responsibilities of the various players in the BSE crisis, those interviewed were asked for their opinion on "What should we do to avoid such problems in the future?", with four measures being proposed:

Table 23:

What should we do to avoid such problems recurring in the future? Would you say you were...? (% EU 15)	Inclined to agree	Inclined not to agree	DNK
Scientists ought to keep us better informed about the possible hazards of certain scientific or technological advances	89.0	5.3	5.7
Scientists ought to communicate their scientific knowledge better	85.9	6.8	7.4
Industry ought to be better regulated	82.4	6.9	10.7
Politicians ought to rely more on the opinion of scientists	72.0	11.6	16.4

It appears that many believe that scientists should be encouraged to warn the public: for 89.0% of Europeans, scientists "ought to keep us better informed of any hazard", and, more generally, "scientists ought to communicate their scientific knowledge better" (85.9%).

The need for a better regulation of the industry also appears desirable to 82.4% of those interviewed. But senior executives are more inclined to reject this proposal (13% as opposed to 7.7% on average) and this measure also appears more contestable

in some of the northern European countries (in Sweden, 30.4% of interviewees disagree with this idea).

Finally, a slightly lower percentage wants "politicians to rely more on the opinion of scientists when making decisions" (72.0%).

4. GMOs: AN IMPORTANT ISSUE

Table 24:

Would you say that you are more inclined to agree or disagree with each of the following propositions on genetically modified foods? (% EU 15)	Inclined to agree	Inclined not to agree	DNK
I want to have the right to choose	94.6	2.5	2.8
I want to know more about this kind of food before eating it	85.9	9.3	4.8
They should only be introduced if it is scientifically proven that they are harmless	85.8	8,0	6,1
I do not want this type of food	70.9	16.9	12.2
They could have negative effects on the environment	59.4	11.9	28.7
The dangers have been exaggerated by the media	33.1	44.3	22.6
This kind of food does not present any particular danger	14.6	54.8	30.6

A series of questions on attitudes to genetically modified foods was put to the public.

The most commonly encountered attitude is the demand to be able to choose and the demand for information: 94.6% of Europeans want to have the right to choose when it comes to genetically modified foods. There are no exceptions to this demand which consistently scores the highest within all the various subgroups making up the sample.

Secondly, people want information: 85.9% of those asked wanted "to know more about this type of food before eating it". Once again, this opinion is very widely held.

The notion that there should be scientific proof that these foods are harmless before they may be eaten meets with the same level of support (85.8%).

Outright rejection ("I do not want this kind of food") is the attitude of 70.9%. Although this attitude is very widespread in Europe, it is nevertheless subject to certain variations. Those with a high level of knowledge (from 11 to 13) are less likely to subscribe to this view, but the difference is small: 65.4% (for an average of 70.9%).

Similarly, 64.3% of the youngest members of the population (15-24 years) adopt this attitude of total rejection as opposed to 74.8% of the eldest (65 years and over). This slightly less hostile attitude on the part of young people is not related

to a higher level of knowledge.[13] On the other hand, it is confined to young men: among the 15-24 year olds, 60.7% of men are hostile to GMOs as opposed to 68.1% of women.

How are we to interpret this difference in attitudes? Two hypotheses are possible:

- either this is a specific feature of generation, which would imply that those who are now 15 to 24 years old have become accustomed at a young age to the scientific innovation symbolised by GMOs and who are therefore for this reason less hostile. If this were the case, we could predict that these age groups would retain their specific character as they get older, that the generations following would resemble them and that, as a result, the fear of GMOs would tend to dwindle in society;
- or, this is not a generation effect, but an age group phenomenon: the youngest, precisely because they are young, are less likely to perceive GMOs as a possible hazard, but this attitude will tend to disappear as they grow older. With this hypothesis, there is no reason why this divergence in attitudes between the young and the less young would change the overall attitude of society to GMOs in the long term.

For the moment there is no rigorous method enabling us to choose with any certainty between these two hypotheses. To measure any possible generation effect, by definition one has to await a new survey on the same subject.

When it comes to attitudes with regard to risks, however, the hypothesis of a simple effect according to age group has some basis: all sociological studies on risk-taking and risk perception reveal that younger people tend to underestimate levels of risk and to actually expose themselves to more risks (such as when driving cars or when consuming drugs of all kinds). We cannot therefore exclude the differences observed here being due to this phenomenon, with the youngest more often rejecting the idea of a risk associated with GMOs precisely because risks in general appear slighter to them and also probably in order to distinguish themselves symbolically from the adult culture, which is strongly influenced by the spirit of caution.

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13 It can be ascertained that this attitude of less hostility holds good among the youngest whatever their level of knowledge.

Table 25:

Answers to the question "GMOs could have negative effects on the environment", according to level of knowledge (% EU 15)

Level of knowledge	Inclined to agree	Inclined not to agree	Don't know
0 to 4	47.7	9.4	43.0
5 to 6	57.1	11.9	31.0
7 to 8	60.3	11.6	28.1
9 to 10	61.1	13.2	25.6
11 to 13	66.0	11.9	22.1
Total	59.4	11.9	28.7

59.4% of Europeans affirm that GMOs could have negative effects on the environment, but 28.7% have no opinion. The higher the level of knowledge, the lower the number of "don't knows" and, at the same time, the more people believe there may be negative effects on the environment. Among those with a low level of knowledge (0 to 4 on our index), 43.0% are don't knows and 47.7% assume there could be harmful consequences, while for those with a high level of knowledge (11 to 13), the percentage of don't knows falls to 22.1%, and 66.0% subscribe to the statement.

The last two questions were formulated in a "positive" way with regard to GMOs. The first suggests that "the dangers have been exaggerated by the media". One third of Europeans (33.1%) endorse this statement while 44.3% disagree. These proportions hardly vary according to socio-demographic criteria with the exception, once again, of the youngest (37.6% among the 15-24 year olds). On the other hand, this opinion is more often supported by the Danes (41.8%), the British (43.9%) and the Greeks (51.8%).

The second opinion: "this type of food does not present any particular danger" is rejected by 54.8% of respondents and approved by 14.6%. Respondents in the Netherlands and Portugal stand out with a slightly higher percentage of agreement (23.1% and 24.3% respectively).

5. LEVELS OF CONFIDENCE

The feeling of confidence in players or organisations was measured from two questions, one general, concerning the professions held in the highest esteem, the second concerning who one would trust for explanations in the event of a disaster.

Table 26:

For which of the following professions do you have the most esteem?

	B	DK	D tot.	GR	E	F	IRL	I	L	NL	A	P	FIN	S	UK tot.	EU 1
Doctors	74.3	58.9	64.4	68.0	68.0	80.4	69.6	67.4	79.2	72.2	65.2	76.5	76.0	73.9	78.0	71.1
Scientists	48.5	50.1	42.7	53.3	47.4	47.9	22.9	46.4	50.1	50.0	36.2	35.2	43.5	54.8	40.9	44.9
Engineers	31.5	28.7	26.6	24.7	32.1	33.8	24.3	27.1	31.9	29.2	16.5	26.4	27.5	24.5	36.3	29.8
Judges	21.3	41.9	35.5	26.0	20.9	20.0	24.0	23.3	32.5	39.1	29.0	30.4	26.3	37.4	27.2	27.6
Sportsmen	30.5	14.7	16.8	49.1	32.8	26.3	35.0	19.3	22.5	27.5	23.1	22.3	17.1	12.9	23.3	23.4
Artists	32.2	19.2	16.4	31.8	25.8	30.3	13.4	29.8	26.4	29.6	13.7	24.9	25.6	17.5	14.8	23.1
Lawyers	17.4	21.3	21.1	17.5	15.2	15.4	16.2	12.5	20.3	24.7	15.6	15.5	14.0	20.3	22.8	18.1
Journalists	20.3	8.8	8.6	24.4	26.7	17.6	14.1	12.3	26.8	15.9	8.1	25.8	10.0	9.3	5.0	13.6
Businessmen	17.8	11.9	9.0	14.5	16	10.6	18.4	18.1	17.1	13.7	16.0	15.6	18.6	11.2	14.6	13.5
None of the above	4.7	7.9	8.9	6.5	8.0	5.6	6.2	6.7	3.6	7.6	9.1	4.8	4.0	6.9	5.1	6.9
Politicians	8.7	13.1	7.8	5.8	6.2	3.2	6.1	4.5	16.8	14.9	8.7	5.9	7.1	9.8	6.3	6.6
DNK	2.6	3.0	3.5	0.4	4.2	1.5	5.5	2.5	2.8	3.4	3.4	3.3	2.0	2.7	3.6	3.0

Esteem for the various professions proposed varies markedly:

- **the three professions held in the most esteem are those with a scientific or technical dimension:** doctors come first (chosen by 71.1% of respondents), followed by scientists (44.9%) and, in third place, engineers (29.8%).

Choosing doctors is linked not so much to cultural criteria as to the age of the person asked (78.0% among those aged 65 and over). The professions of scientist and engineer, on the other hand, are accorded greater esteem the higher the age when studies were finished or the higher the level of knowledge (59.0% and 38.3% respectively among those who have a knowledge "mark" of 11 to 13). Both France and Great Britain appreciate the medical profession more (80.4% and 78.0% respectively), while the scientific professions are held in greater esteem in Sweden (54.8%), Denmark (50.1%) and Greece (53.3%).

- Judges obtain 27.6% of the votes, lawyers 18.1% (the legal professions are more appreciated in Denmark and the Netherlands). But sportsmen (23.4%) and artists (23.1%) take precedence.

- Journalists and businessmen (or women) are more or less at the same level (13.5% and 13.6%).
- **Politicians come last with only 6.6% of the votes.** Only three countries have a slightly higher estimation of this profession: Luxembourg (16.8%), the Netherlands (14.9%) and Denmark (13.2%).

Comparisons with the previous survey are difficult because the question was not put in exactly the same way.[14] The general order of voting was nevertheless identical for the first two professions: doctors first, followed by scientists. Next came "judges", then "engineers" (who, in contrast, were ranked slightly higher than judges in the last survey).

Table 27:

Imagine that there has been a disaster in your neighbourhood or district. Who would you most trust to explain the reasons for this disaster? (% EU 15)	**Most trust**	**In second place**	**In third place**	**Cumulative total**
Scientists	33.2	17.5	11.9	62.6
Environmental protection associations	20.4	23.7	15.7	59.8
Doctors	20.1	18.7	16.5	55.
None of the above	5.1	11.3	16.2	32.6
Consumer associations	6.9	12.2	12.5	31.6
Government representatives	4.0	6.3	9.6	19.9
Journalists	3.7	5.6	8.4	17.7
DNK	4.9	2.6	4.8	12.3
Businesses	0.6	1.2	2.6	4.4
Others (spontaneous)	1.0	0.8	1.8	3.6

The hierarchy of players or organisations that people would trust in the event of a "disaster in their neighbourhood or district" only partially reproduces the situation described above, as new players are mentioned.

If we consider the cumulative total of the three options proposed to interviewees, once again we observe that the players with scientific skills head the league table: scientists come first with 62.7%, followed by doctors (55.3%). The first are more likely to be chosen by those who have pursued lengthy studies, the second above all by elderly

[14] In 1992, two choices were offered; in this study, the number of possible choices was left to the initiative of the respondent.

people. Greater confidence is placed in scientists in Denmark and Greece (74.7% and 83.4%).

Environmental protection organisations and consumer defence organisations gather a significant number of votes: 59.8% and 31.6% respectively.

This time some credence is given to government representatives (19.9%) and journalists (17.7%), while businesses come last (3.1%).

6. YOUNG PEOPLE AND THE SCIENTIFIC VOCATION CRISIS

Table 28:

What do you think is the main reason - if there is one - for the falling interest of young people in scientific studies and careers? (% EU 15)	Main reason	In second place	In third place	Cumulated total
Science lessons at school are not appealing enough	25.2	19.6	14.7	59.5
Scientific subjects are too difficult	19.8	21.8	13.4	55.0
Young people are less interested in working in the scientific field	14.5	15.6	19.5	49.6
Salaries and career prospects are not sufficiently attractive in the scientific field	14.5	15.1	12.9	42.5
None (spontaneous)	2.4	15.7	20.7	38.8
Science has too negative an image in our society	10.1	8.1	11.8	30.0
DNK	12.2	3.3	5.1	20.6
Others (spontaneous)	1.3	0.9	2.0	4.2

What is the cause of young people's disaffection from scientific studies and careers? The most frequent answer to this question is the lack of appeal of scientific studies (59.%), next the difficulty of these subjects (55.0%) and, thirdly, young people's lack of interest in scientific subjects (49.6%). Poor career prospects are also mentioned (42.4%), while only 29.9% of respondents feel that this disaffection could stem from a poor image of science in society.

Table 29:

Reasons for the lack of interest in scientific subjects of young people still studying and in the sample as a whole (% EU 15)

	Still studying	Sample as a whole	Deviation
Science lessons are not appealing enough	67.3	59.5	7.8
Scientific subjects are too difficult	58.7	55.0	3.7
Young people are not so interested in scientific subjects	53.4	50.2	3.2
Salaries are not attractive enough	40.0	41.8	-1.8
Science has too negative an image	34.0	31.4	2.6

A comparison of these overall results, with those of respondents who are still studying shows that all these reasons are quoted more frequently by senior school pupils or students than by the sample as a whole. For instance, 67.3% of young people who are still studying consider that science lessons are "not appealing enough" as opposed to the overall average of 59.5%. The only exception to this rule is the alleged lack of

material advantages (salaries, careers), which is a little less frequently cited by young students than by the sample as a whole (40.0% as opposed to 41.8%).

Table 30:

Concerning the fall in interest for science by young Europeans, would you say that for each of the following statements you are…? (% EU 15)	**Inclined to agree**	**Inclined not to agree**	**DNK**
This is a serious threat to future socio-economic developments	42.4	30.2	27.5
Companies will always find the skilled people they need	54.9	26.2	18.9
The authorities should try to remedy this situation	60.3	19.6	20
Nothing should be done: individual freedom of choice is more important than the needs of society and industry	44.8	32.1	23.1
More should be done to encourage girls and young women to pursue scientific studies and careers	70.8	12.7	16.5
The European Union should be more open to foreign scientists	63,1	15,3	21,6

The following series of questions concerns possible government policies to respond to the lack of scientific vocation.

First, it appears that **only 42.2% of Europeans** (but 47.5% of those who have pursued lengthy studies and 46.9% of senior executives) **agree that this lack of scientific vocation would constitute "a threat for future socio-economic development".**

As this threat is not perceived as urgent, it is logical that **54.1% of respondents believe that companies "will always find the skilled people that they need**".

However, almost two-thirds of Europeans support the idea of active public policies in this area: 60.3% would like "the authorities to remedy this situation", this opinion being of course much more widespread (74.1%) among those who believe that the lack of vocation is a threat.

On the other hand, 44.8% of respondents would advocate a *laissez faire* policy in this area.

Finally, the European public gives very widespread support to two solutions: firstly, the need to encourage girls and young women to pursue scientific studies, with a total of 70.8%. This opinion is subscribed to by 81.2% of women with a high knowledge index level (11 to 13), but is not more widespread among young girls who are currently studying (66.8%).

The other solution accepted by a majority of Europeans consists of opening up the EU more to foreign scientists (63.1%), this option meeting with even greater favour among those who have a high level of knowledge (70.1%) and among senior executives (72.3%).

7. EUROPEAN SCIENTIFIC RESEARCH

Table 31: The responsibility of the European Union

In which of the following areas do you think the European Union is actively involved?	% EU 15
Agriculture	59.2
International trade	53.5
Environment	50.7
Foreign affairs	44.6
Defence	41.5
Science, research and technology	38.2
Energy	33.0
Consumer protection	28.9
Employment and social affairs	28.8
Regional development	22.4
DNK	14.0
None of the above (spontaneous)	2.3
Others (spontaneous)	1.4

The European public has an imperfect knowledge of the areas of competence of the EU.

- The three areas quoted by at least half of Europeans are agriculture (59.2%), international trade (53.5%) and the environment (50.7%).
- This is followed by foreign affairs (44.6%), defence (41.5%), science and technology (38.2%) and energy (33.0%).
- The other areas are cited by less than a third of respondents, and include consumer protection (28.9%), employment and social affairs (28.8%) and, last of all, regional development (22.4%).

It is striking that the answers attributing competence to the EU regularly increase the higher the age when studies were finished (Graph 4), **whatever the area considered,** whereas the percentages of don't knows are higher both for those who left school early and for those who are currently studying.

Graph 4: Perceptions of EU competences according to age when studies finished[15]

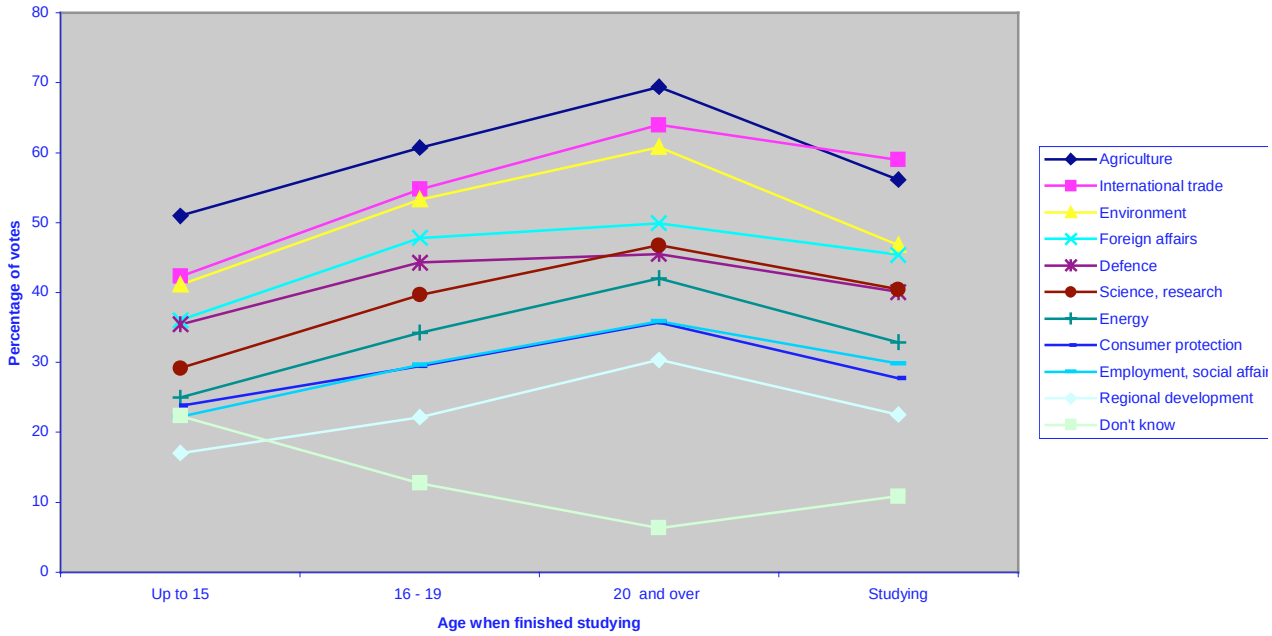

Table 32

Do you think that the European Union ought to be active or not in the following policy areas? (% EU 15)	Active	Not active	DNK
The environment	86.4	5.9	7.7
Agriculture	80.5	10.2	9.3
Science, research and technology	80.2	8.8	11
International trade	77.6	10.1	12.4
Consumer protection	77.6	12.1	10.3
Energy	75.5	12.3	12.3
Foreign affairs	72.2	14.4	13.3
Employment and social affairs	71.7	15.8	12.5
Defence	68.7	18.4	12.9
Regional development	56.4	27.8	15.8

The following question permits a comparison between Europeans' perceptions regarding the areas of competence of the EU and their preferences. Table 33 gives the two series of percentages and the deviation between wishes and perceptions (i.e. the difference between the wish percentage and the perception percentage).

15 As this is a matter of general and not scientific knowledge, we did not use the scientific knowledge index here, but the age when studies were finished.

Table 33:

Perception of the EU's activity in different areas: perceived reality, wishes and the deviations between the two (% EU 15):

	Perception	Wish	Deviation
Consumer protection	28.9	77.6	48.7
Employment, social affairs	28.8	71.7	42.9
Energy	33.0	75.5	42.5
Science and technology	38.2	80.2	42.0
Environment	50.7	86.4	35.7
Regional development	22.4	56.4	34.0
Foreign affairs	44.6	72.2	27.6
Defence	41.5	68.7	27.2
International trade	53.5	77.6	24.1
Agriculture	59.2	80.5	21.3

On the whole, Europeans would like the EU's activities to be stepped up in all the areas referred to, but some are emphasised more than others: **in four areas, the deviation between wishes and perceptions is particularly high, namely consumer protection (48.7%), employment and social affairs (42.9%), energy (42.4%) and science (42.1%).**

Table 34:

Effectiveness of research in the European Union

In your opinion, would you say that, compared with national research European research …? (% EU 15)	Yes	No	DNK
will become more and more important	72.1	9.0	18.9
is in the interest of industry	68.3	10.1	21.6
favours economic growth	60.3	14.4	25.2
is in the interest of everybody	59.9	18.5	21.6
is more effective	58.2	18.6	23.1
is in the national interest	58.0	18.7	23.3
saves money	44.1	28.8	27.1
duplicates national efforts	38.1	27.6	34.2

Interviewees were asked to compare the qualities of national research and research carried out at European level with respect to a number of criteria. The results show that research conducted at Community level is perceived above all as becoming more and more important (72.1%). A similar proportion of people believe that this research is "in the interest of industry" (68.3%). A large majority of Europeans support other qualities; compared with national research, European research promotes economic

growth (60.3%), is conducted "in the interest of everybody" (59.9%), is more effective (58.2%) and is in the national interest (58.0%). On the other hand, only 44% of the sample thinks that this research "saves money" (but 27.1% are not able to answer this question). Finally, while 38.1% of respondents believe that research carried out at European level duplicates national research, there is also a high rate of don't knows for this question (34.2%).

Graph 5 shows that the higher the level of knowledge, the greater the number of qualities attributed to European research.

Graph 5: Compared qualities of research carried out at national or European level according to knowledge index

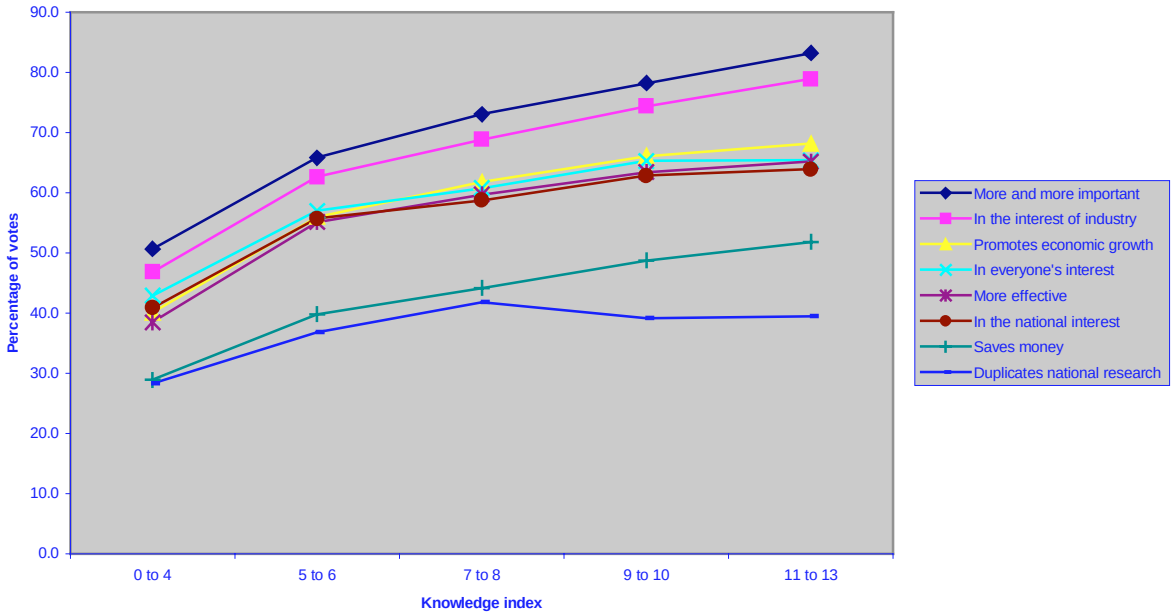

Table 35:

The level of research in the European Union

Many important scientific and technological developments have originated outside Europe. Would you say whether you are…? (% EU 15)	Inclined to agree	Inclined not to agree	DNK
Researchers in the different European countries ought to cooperate more	84.1	4.5	11.3
There should be more coordination of research between the member countries of the European Union	80.4	5.0	14.6
Scientists and industrialists ought to cooperate	78.7	7,2	14.1
More people ought to work in technological research and development in Europe	69.3	10.1	20.6
There ought to be more women in European scientific research	67.4	9.2	23.4
The European Union ought to spend more money on research	64.4	15.6	20.1
Public research budgets ought to be higher in Europe	60.1	15.8	24.1
The best scientists leave Europe for the United States	58.3	14.3	27.4
European scientists ought to be more interested in patenting and in the use of their research results	55.3	16.2	28.5
European research priorities reflect more the subject areas which interest scientists than the needs of society	38.3	28.6	33.1
Europeans should be less concerned with ethical questions relating to modern science and technology	30.9	45.8	23.3

Suggesting that some major research applications have originated outside Europe (the Internet, biotechnologies), this question puts forward measures likely to improve European research. The answers given indicate an accurate assessment of the weaknesses of European research.

- **The three most commonly encountered answers concern not the level of scientific investment but the organisation of research, i.e.:** improving cooperation between European researchers (84.1%), coordinating research (80.4%) and improving cooperation between public research and industry (78.7%).
- **The next four questions, on the other hand, concern the level of scientific investment,** either in terms of staff - more people ought to work in research (69.3%), there ought to be more women in research (67.4%), or in terms of funding - the EU ought to spend more money on research (64.4%) and national budgets ought to be larger (60.1%).
- 58.3% of those questioned believe that the best scientists leave Europe. A similar proportion (55.3%) blames European scientists for their lack of interest in patents.
- Finally, two ideas are accepted by only a minority of Europeans: 38.3% believe that "research priorities reflect the subject areas which interest scientists more

than society's needs" (but a third of the sample is unable to answer this question) and 30.9% believe that "Europeans should be less concerned with ethics", but 45.8% disagree with this proposition.

Graph 6 shows that the higher the respondent's level of knowledge, the more he or she is likely to approve various ways of improving European research. This rule is borne out for the first two series of measures (improving the organisation of research and increasing scientific investment). On the other hand, there is practically no variation in the opinion as to whether scientists ought to be more interested in patenting. **Finally, the best informed people are more likely to reject the idea that research priorities are focused on researchers' interests or that less concern should be given to ethical questions.**

Graph 6: Ways of improving European research according to knowledge index

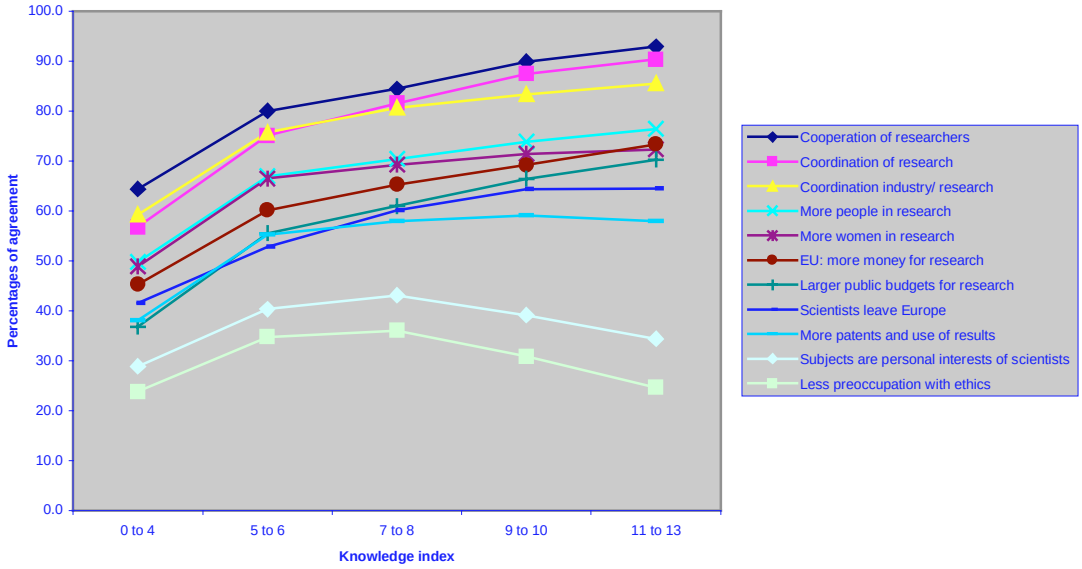

Table 36:

Some new countries are soon going to join the European Union. Would you say that you are…? (% EU 15)	Inclined to agree	Inclined not to agree	DNK
This enlargement will improve the scientific and technological potential of the new member countries	62.7	11.7	25.5
This enlargement will improve the scientific and technological potential of current member countries	53.3	21.2	25.6

Is the addition of new members to the EU going to improve the scientific potential of the current members and the new members? Most Europeans believe that enlargement will above all benefit the current applicant countries: 62.7% of respondents believe that, as new members, they will benefit from improvement of their scientific potential. But for 53.3% of those asked, this process will also benefit the current member countries.

The relative assessment of benefits is thus, on the whole, in favour of the new members since the percentage difference is positive in their favour (62.7 - 53.3, or a deviation of 9.4). But if we analyse the answers according to the knowledge index, the deviation between the perceived benefit for the new members and the perceived benefits for the existing members is greater the higher the level of knowledge (Table 37). Perceived benefits increase for all countries, depending on the level of knowledge, but more steeply for the new members.

Table 37:

Scientific benefit of EU enlargement for current members and for new members, and deviation between these two values according to knowledge index

Knowledge index	Benefit for current members	Benefit for new members	Deviation
0 to 4	35.1	35.5	0.5
5 to 6	48.5	52.4	4.0
7 to 8	55.1	62.1	7.0
9 to 10	59.7	72.4	12.7
11 to 13	59.1	79.3	20.2
Average	53.3	62.7	9.5

A similar analysis by country shows that the relative benefit for the new members is also perceived to be much higher in the northern than in the southern European countries. In Denmark, for example, 45.6% of respondents think that there will be benefits for the existing members and 82.5% for the new members (a deviation of

36.9%). At the other extreme, in Greece, these same figures are respectively 59.0% (current members) and 60.4% (new members), or a deviation of 1.5%.

ANNEXES

TECHNICAL SPECIFICATIONS

STANDARD EUROBAROMETER 55.2
TECHNICAL SPECIFICATIONS

Between 10 May and 15 June 2001, the European Opinion Research Group, a consortium of market study and public opinion agencies, made up of INRA (Europe) and GfK Worldwide, carried out wave 55.2 of the standard Eurobarometer at the request of the European Commission, Press and Communication Directorate-General, Public Opinion Sector.

Eurobarometer 55.2 covers the population of the respective nationalities of the European Union Member States, aged 15 years and over, resident in each of the Member States. The basic sample design applied in all Member States is a multistage, random (probability) one. In each EU country, a number of sampling points was drawn with probability proportional to population size (for total coverage of the country) and to population density.

In order to do this, the points were drawn systematically from each of the "administrative regional units", after stratification by individual unit and type of region. They thus represent the whole territory of the Member States according to the Eurostat-NUTS II and according to the distribution of the resident population of the respective EU nationalities in terms of metropolitan, urban and rural areas. In each of the selected sampling points, a starting address was drawn at random. Further addresses were selected (every Nth address) by standard random route procedures from the initial address. In each household, the respondent was drawn at random. All interviews were face-to-face in people's homes and in the appropriate national language.

Country	Institute	Number of interviews	Fieldwork dates	Population 15+ (x 000)
Belgium	INRA Belgium	1058	10/05 – 15/06	8 326
Denmark	GfK Danmark	1000	10/05 – 15/06	4 338
Germany (East)	INRA Deutschland	1026	12/05 – 07/06	13 028
Germany (West)	INRA Deutschland	1012	12/05 – 13/06	55 782
Greece	MARKET ANALYSIS	1004	14/05 – 12/06	8 793
Spain	INRA Espagne	1000	14/05 – 11/06	33 024
France	CSA-TMO	1004	10/05 – 07/06	46 945
Ireland	Lansdowne Market Research	1006	17/05 – 02/06	2 980
Italy	INRA Demoskopea	995	18/05 – 10/06	49 017
Luxembourg	ILRes	619	10/05 – 15/06	364
Netherlands	INTOMART	1061	19/05 – 15/06	12 705
Austria	Spectra	1019	16/05 – 11/06	6 668
Portugal	Metris	1000	12/05 – 04/06	8 217
Finland	MDC Marketing Research	1022	12/05 – 15/06	4 165
Sweden	GfK Sverige	1000	10/05 – 15/06	7 183
Great Britain	INRA UK	1000	10/05 – 14/06	46 077
Northern Ireland	Ulster Marketing Surveys	304	18/05 – 02/06	1 273
TOTAL NUMBER OF INTERVIEWS		16029		

For each country a comparison between the sample and the universe was carried out. The universe description was derived from Eurostat population data. For all EU Member States a national weighting procedure, using marginal and intercellular weighting, was carried out based on this universe description. In all the countries, at least the sex, age, NUTS II regions and size of the conglomeration were introduced into the iteration procedure. For the international weighting (i.e. EU averages), INRA (Europe) uses the official population figures as provided by Eurostat in the Regional Statistics Yearbook (1997 data). The total population figures for input in this post-weighting procedure are listed above.

The results of the Eurobarometer studies are reported in the form of tables, data files and analyses. For each question, a table of results is given with the full question text in English and French. These results are expressed as a percentage of the total. The results of the Eurobarometer surveys are analysed by the Public Opinion Sector of the Directorate-General for Press and Communication of the European Commission, Rue de la Loi 200, B-1049 Brussels. The results are published on the Internet site of the European Commission: http://europa.eu.int/comm/dg10/epo. All Eurobarometer data files are stored at the Zentralarchiv (Universität Köln, Bachemer Strasse 40, D-50869 Köln-Lindenthal), available through the CESSDA database http://www.nsd.uib.no/cessda/europe.html. They are at the disposal of all the institutes which are members of the European Consortium for Political Research (Essex), of the Inter-University Consortium for Political and Social Research (Michigan) and of all those interested in social science research.

Readers are reminded that survey results are estimates. All other things being equal, their accuracy depends upon the sample size and the observed percentage. With samples of about 1 000 interviews, the real percentages vary within the following confidence limits:

Observed percentages	10% or 90%	20% or 80%	30% or 70%	40% or 60%	50%
Confidence limits	± 1.9%	± 2.5%	± 2.7%	± 3.0%	± 3.1%

STANDARD EUROBAROMETER 55.2
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