Eurobarometer 35.1

OPINIONS OF EUROPEANS ON BIOTECHNOLOGY IN 1991

REPORT UNDERTAKEN ON BEHALF OF THE DIRECTORATE-GENERAL SCIENCE, RESEARCH AND DEVELOPMENT OF THE COMMISSION OF THE EUROPEAN COMMUNITIES

"CUBE" UNIT
(Concertation Unit for Biotechnology in Europe)

by
INRA (Europe) sa/nv
European Coordination Office

This opinion poll was undertaken at the request of the Commission of the European Communities (Directorate-General "Science, Research and Development"; "CUBE" Unit).

It was carried out in the whole of the European Community, in March-April 1991, by twelve specialist institutes, under the general co-ordination of INRA (EUROPE) - European Coordination Office, based in Brussels.

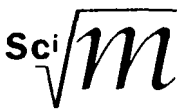
The questionnaire, the names of the institutes involved in the research, as well as various technical details (sampling method, composition of the sample, ...) are in the appendix.

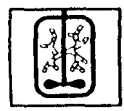
This report, written by Eric MARLIER, is in no way binding upon the Commission of the European Communities.

Biotechnology in public

a review of recent research

edited by John Durant





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Some Key Results of the Survey

* A large number of persons interviewed - in particular in Greece, Spain and, above all, Portugal - were unable or unwilling to answer certain questions.

* The two principal sources of information used by Europeans on "new developments that affect our way of life" are 1) television and 2) newspapers.

* The most reliable sources of information on biotechnology/ genetic engineering are considered to be, respectively, consumer organisations, environmental organisations and schools or universities.

* In general, the term "genetic engineering" is less well known and has a more negative connotation than "biotechnology".

* One European in two believes that biotechnology / genetic engineering will improve our way of life over the next 20 years; only one in ten believes the opposite. Men, young people, people having a higher educational level or being "comfortably off' are the most optimistic in this area; these groups are also the best informed on biotechnology / genetic engineering applications.

* Support for biotechnology / genetic engineering depends largely on the type of application under consideration and is directly related to the risk associated with it; a risk which, among other things, is considered to be neither negligible nor dramatic, regardless of the application. Except for research on farm animals and, to a lesser extent, food research, where opinions are mixed, Europeans "tend to agree" that research into biotechnology/ genetic engineering" is worthwhile and should be encouraged".

* Regardless of their nationality, the large majority of persons interviewed consider that all types of research into biotechnology / genetic engineering need to be controlled by the government.

Contents

Introduction

In just a few years, our understanding of the ways that living things function has progressed greatly. This progress has stimulated - and in turn has been stimulated/ made possible by - the development of new technologies permitting us to use and to modify living systems and organisms with ever increasing precision and to control them better and better.

The media have responded rapidly to the scientific revolution of biotechnology - as much to praise the great innovations made possible by biotechnology as to denounce the risks, many regarded as serious, that the technology poses and focussing on the more alarming speculations that people make.

Aware of the importance of this new technology, from 1982 the Commission of the European Communities began a series of research and development programmes in the biotechnology field. Gradually, this research (conducted both within and outside the European Community and driven by programmes supported by both the public and private sectors) has begun to address the question of applications of biotechnology, in particular in the areas of agriculture, the food industry, pharmaceuticals and health care.

In parallel with these developments, an increasing number of political measures have needed to be taken. Some of these address biotechnology specifically: the definition of limits beyond which experimentation should not go, i.e. in the particularly delicate "bio-ethics" debate (in areas such as applications or experiments on the "identity" of man or animals); problems of intellectual property that biotechnology raises; etc. Others touch on the

interpretation or the adaptation of existing policies, whether this be in the field of agriculture, industry, safety at work, etc.[1]

Discoveries in biotechnology arouse the curiosity and incite the enthusiasm of a large number of specialists from the various biological disciplines (both researchers and industry). These specialists imagine, sometimes underestimating some of the practical difficulties with which they are confronted, that biotechnology is capable of "contributing" towards solving some of the major problems facing humanity nowadays - such as famine, health, the environment and over-population.

This curiosity and enthusiasm are far from being shared by all the rest of the population, or even by public authorities and the political world; for this reason, some research efforts have been delayed, whilst others, have faced opposition, or have even been opposed completely.

There are several factors that are likely to influence attitudes with regard to biotechnology:

questions of philosophy, values or ethics in general;

a lack of information on the subject, leading to misunderstanding;

distrust of the objectives and capabilities of the promoters of these innovations (for example their ability to control the possible risks / accidents which, some believe, are far from being negligible);

nationality;

diverse socio-demographic variables such as sex, age and educational level, etc.

[1] For a description of the current situation in this area, the interested reader is invited to refer to the April 1991 communique, available in the nine languages of the European Community: Commission of the European Communities (1991), "Promoting the Competitive Environment for the Industrial Activities based on Biotechnology within the Community", SEC(91)629.

In the present study, there is no question of attempting to evaluate the soundness of the basis of biotechnological research. The objective is simply to analyse the results of an opinion survey conducted in the context of the Eurobarometer[2] number 35.1, conducted between 28 March and 25 April 1991 simultaneously in the twelve countries of the European Community.

This survey posed thirteen questions aimed at better understanding the opinion of Europeans on biotechnology. It focussed on four different aspects:

a) the reputation and knowledge / understanding of biotechnology / genetic engineering;

b) attitudes and opinions with regard to diverse applications of biotechnology / genetic engineering;

c) information sources that people use to derive their knowledge of new developments that affect our way of life;

d) information sources that people trust with regard to biotechnology / genetic engineering.

In each country these questions were asked of a representative sample of the national population aged at least 15 years. In total 12,800 people were interviewed, in other words 1,000 per country with the exception of Luxembourg (500), Germany (2,000: 1,000 in the ex-Federal Republic and 1,000 in the ex-Democratic Republic) and the United Kingdom (1,300: 1,000 in **Great** Britain and 300 in Northern Ireland).

There are several different ways to define "biotechnology". For some people, it only includes modem (post-1974) techniques of genetic engineering, **i.e.** methods of recombining segments of DNA. For others

[2] Eurobarometer polls ("standard Eurobarometer poll") have been undertaken each Spring and Autumn since September 1973 (Eurobarometer N°0), on behalf of the **DG** of Audiovisual, Information, Communication and Culture of the Commission of the European Communities. They include Greece since Autumn 1980, Portugal and Spain since Autumn 1985, as well as the ex-GDR since Autumn 1990.

biotechnology has a far wider scope including either all applications of the life sciences (which is the literal sense of the term) or, more specifically, fermentation industries, including both traditional sectors (yeasts, milk fermentation products ... in other words brewing, cheese production, baking etc.) and more recent applications (such as fermentation for the production of antibiotics, which included developments in pharmaceutical research started some fifty years ago).

A great deal of confusion therefore surrounds the definition of these new technologies. In order to determine whether Europeans perceive the terms "biotechnology" (the same term in all nine official languages of the Community: cf Appendix 2) and "genetic engineering" (a term which varies considerable from one language to the next: cf Appendix 2) in the same way, i.e. to attempt to understand the different connotations attached to these terms, two versions of the same questionnaire were drawn up, one using the term "biotechnology" and the other the term "genetic engineering".

The "biotechnology" questionnaire was used with roughly half (49%) of the interviewed sample, and the "genetic engineering" questionnaire among the other half (51%).

This survey was undertaken at the request of the "CUBE" unit ("Concertation Unit for Biotechnology in Europe") of the Commission of the European Communities[3]. It forms part of the current (1990-1993) "BRIDGE" research and development programme ("Biotechnology Research for Innovation, Development and Growth in Europe").

The means applied to this programme are:

905% for research and training in biotechnology, and;

95% for a "concertation" programme, the responsibility for which rests in the "CUBE" unit and one objective of which is to

[3] The "CUBE" unit is part of the "Biology" section of the Directorate-General "Science, Research and Development" of the Commission of the European Communities.

contribute to better public information in the biotechnology field and, from this, to achieve a better understanding of the nature, potential and possible risks of this research.

The "Community results" (i.e. those relating to the Twelve) which appear in this report include, of course, the ex-Democratic Republic of Germany. They are weighted mean of results, with each nation's results being weighted by the proportion of that nation's population aged 15 years or more in the total Community population aged at least 15 years[4].

The total **of** the percentages presented in the tables of this study can exceed 100% when a respondent has the possibility of providing multiple responses to the same question. They can also vary slightly from 100% (e.g. 99% or 101%) due **to** rounding.

Finally we should point out that the results from the "biotechnology" and "genetic engineering" sub-samples are not indicated separately except when the differences are statistically significant. Everywhere else the results are therefore those of the total sample.

[4] The results for unified Germany ("D-Gesamt") are established from separate results for the ex-Federal Republic and the ex-Democratic Republic, using the same logic.

Chapter 1: Anticipated Effects of New Technologies

Chapter 1: Anticipated Effects of New Technologies

Before immersing members of the sample in the complex subject matter under consideration, it seemed a good idea to ask some questions on the effect of new technologies in general: will they improve our way of life in the coming twenty years, will they have any effect at all, or will they in fact make our lives worse?

As Table la and Ib and Graph 1, show, replies to this question are very optimistic.

At Community level, the results can be summarised as:

a) The number of "don't knows" (don't know/no response) are very high, particularly with respect to "genetic engineering" (28%) and "biotechnology" (30%).

b) The means vary between +0.45 (genetic engineering) and +0.86 (telecommunications), this signifying that people interviewed generally expect that the new technologies presented do have an effect and that this effect tends to improve our quality of life.

c) The most severe judgements or, to be more precise, the least favourable, are reserved for space exploration (45% of responses expecting an improvement and a mean score of +0.47) and genetic engineering (47% of responses expecting an improvement and a mean score of +0.45, these differing significantly from those for biotechnology: 54% and +0.66 respectively).

QUESTION: **Science and technology change the** May we **live.**
1 an going to read out a lift of areas in which new technologies are currently developing. For each of these areas, do you think it Mill improve our way of life in the next 20 years, it Mill have no effect, or it will make things worse ?

Table. la ; Parcentages and means for EC 12

	Will improve	No effect	Will make things worse	DK/NA	TOTAL	Means (*)
SOLAR ENERGY	76	12	2	9	99	+0.81
COMPUTERS AND INFORMATION TECHNOLOGY	74	11	5	10	100	+0.76
BIOTECHNOLOGY (**)	54	9	7	30	100	+0.66
GENETIC ENGINEERING (***)	47	10	15	28	100	+0.45
TELECOMMUNICATIONS	80	10	1	9	100	+0.86
NEW MATERIAL OR SUBSTANCES	64	11	4	22	101	+0.76
SPACE EXPLORATION	45	28	7	20	100	+0.47

Table Ib : National breakdown of "don't knows" *(%)* and means

1st column : Means (*) 2nd column : % of DK/NA	B		DK		D-WEST		D-OST		D-GESAMT		GR		E		EC12	
	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?
SOLAR ENERGY	+0.78	16	+0.83	4	+0.82	8	+0.84	10	+0.82	8	+0.90	14	+0.89	12	+0.81	9
COMPUTERS AND INFORMATION TECHNOLOGY	+0.74	12	+0.65	11	+0.66	12	+0.85	7	+0.70	11	+0.88	17	+0.89	12	+0.76	10
BIOTECHNOLOGY (**)	+0.76	28	+0.50	24	+0.35	26	+0.62	25	+0.40	25	+0.77	51	+0.87	35	+0.66	30
GENETIC ENGINEERING (***)	+0.29	33	+0.01	24	+0.39	26	+0.63	24	+0.44	26	+0.62	54	+0.77	34	+0.45	28
TELECOMMUNICATIONS	+0.88	11	+0.79	10	+0.75	13	+0.91	6	+0.79	11	+0.96	10	+0.97	14	+0.86	9
NEW MATERIALS OR SUBSTANCES	+0.83	16	+0.78	17	+0.65	24	+0.82	24	+0.68	24	+0.68	36	+0.83	32	+0.76	22
SPACE EXPLORATION	+0.50	21	+0.50	14	+0.38	22	+0.39	21	+0.38	22	+0.59	30	+0.69	24	+0.47	20
1st column : Means (*) 2nd column : % of DK/NA	**F**		**IRL**		**I**		**L**		**NL**		**P**		**UK**		**EC12**	
	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?
SOLAR ENERGY	+0.74	7	+0.73	20	+0.82	10	+0.76	11	+0.86	4	+0.90	27	+0.80	8	+0.81	9
COMPUTERS AND INFORMATION TECHNOLOGY	+0.66	8	+0.82	11	+0.86	12	+0.81	11	+0.74	9	+0.94	26	+0.75	8	+0.76	10
BIOTECHNOLOGY (**)	+0.75	25	+0.77	38	+0.78	32	+0.64	25	+0.49	22	+0.92	54	+0.73	29	+0.66	30
GENETIC ENGINEERING (***)	+0.36	22	+0.59	35	+0.52	26	+0.29	23	+0.27	27	+0.84	45	+0.32	28	+0.45	28
TELECOMMUNICATIONS	+0.88	4	+0.93	11	+0.88	11	+0.80	9	+0.89	6	+0.96	18	+0.82	6	+0.86	9
NEW MATERIALS OF SUBSTANCES	+0.83	13	+0.74	27	+0.65	25	+0.66	20	+0.82	12	+0.91	45	+0.79	14	+0.76	22
SPACE EXPLORATION	+0.49	15	+0.34	26	+0.57	23	+0.39	21	+0.47	12	+0.60	42	+0.33	12	+0.47	20

(*) Means are calculated by applying the coefficients +1, 0 and -1to responses "•will improve our way of life", "no effect" and "will Make things worse" respectively; the central point is therefore 0: below this point, negative responses predominate, and, above this point, positive responses. "Don't knows" are excluded from the calculation.

(**) This item was proposed to half (49%) of the sample; the other half was asked to evaluate genetic engineering.

(***) This itci was proposed to half (51%) of the sample; the other half was asked to evaluate biotechnology.

d) Europeans' "global optimism" with regard to the seven[1] new technologies presented can be evaluated simply by calculating the average percentage of "will improve our way of life" replies. This comes to 65% (versus 13% saying that they will have "no effect", 5% saying that they "will make things worse" and 17% "don't know"), in other words a particularly positive result.

e) Another identical measure of "global optimism" is to calculate: 1) for each individual, the number of "will improve" responses they give (a number varying from 0 to 6: cf note 1 above), and; 2) calculate a Community average from these 12,800 responses, this giving the "global optimism". This Community mean is 3.88/6 (versus 0.80, 0.32 and 0.98 for the "no effect", "will make things worse" and "don't know" scores respectively).

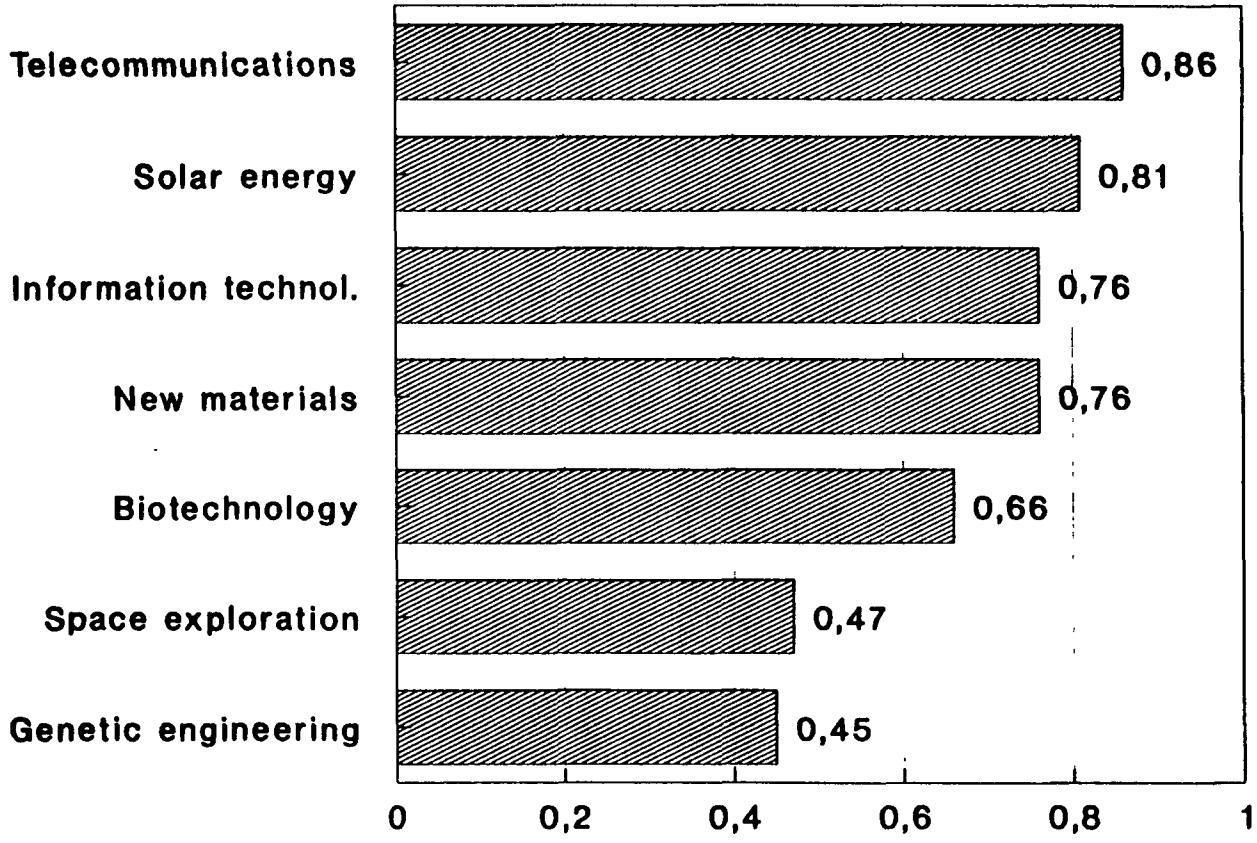
At national level, the results can be summarised as:

a) The number of "don't knows" varies considerably from one country to the next: it is highest in Portugal (mean: 35%), Greece (27%) and Spain (22%); it is less (even if it is higher than the 10% level, which is not negligible) is the Netherlands (11%), France (12%), Denmark (13%) and the United Kingdom (13%).

b) The general optimism with regard to new technologies is evident throughout the Community. Regardless of the country, mean scores are above zero: the lowest (+0.01) is in Denmark and concerns "genetic engineering"; all other vary from +0.27 (Netherlands; genetic engineering) and +0.97 (Spain; telecommunications).

[1] Remember that each person interviewed was asked to evaluate either biotechnology or genetic engineering, in other words to evaluate a total of six items.

Graph 1 : Anticipated effects of new technologies - by application area (EC12 means) (*)



(*) Means vary from +1 ("will improve our way of life") to -1 ("will make things worse"): cf. tables 1,2.

c) Considering all member states, the least favourable judgements are those with respect to space exploration (of the 14 means, 10 are less than or equal to +05), genetic engineering (8 means less than or equal to +05) and biotechnology (4 means less than +05).

d) With the exception of the ex-Federal and Democratic Republics of Germany, where the differences are insignificant, biotechnology is judged more favourably than genetic engineering. We note with interest that, in the case of Germany, the means of all seven new technologies presented are higher in the ex-Democratic Republic than in the West; this difference is particularly marked in the case of biotechnology / genetic engineering.

e) Ranking "global optimism" with regard to the seven new technologies proposed in each Community country (separating the ex-Federal and Democratic Republics of Germany) (cf. supra point (e) page 11) we arrive at:

-	Spain	4.23/6
	Netherlands	4.18
	France and Italy	4.03
-	ex-GDR	3.98
	United Kingdom	3.92
	Belgium and Denmark	3.89
	EC12	3.88
	Greece	3.85
	Luxembourg	3.71
	Ireland	3.66
-	Portugal	357
	Germany (combined scores)	3.51
	ex-FRG	3.39

Table 2 : Anticipated effects of new technologies - by application area (breakdown at EC 12 level of "don't knows" (%) and means * by various socio-demographic variables)

QUESTION: Science and technology change the way we live.
I am going to read out a list of areas in which new technologies are currently developing.
For each of these areas, do you think it will improve our way of life in the next 20 years, it will have no effect, or it will make things worse?

		SEX		AGE				AGE AT END OF STUDIES					LEVEL OF INCOME (****)				RELIGIOSITY (*****)		TOTAL
		M	F	15-24	25-39	40-54	55+	-16	16-17	18-19	20+	still stud.	++ high	+	-	-- low	Reli-gious	Non re-ligious	EC 12
SOLAR ENERGY	- Means	+0.81	+0.82	+0.84	+0.83	+0.82	+0.78	+0.78	+0.80	+0.84	+0.84	+0.85	+0.83	+0.85	+0.82	+0.78	+0.82	+0.82	+0.81
	- % DK/NA	7	12	7	6	7	15	17	6	5	3	5	4	6	10	16	11	6	9
COMPUTERS AND INFORMATION TECHNOLOGY	- Means	+0.80	+0.73	+0.82	+0.79	+0.78	+0.68	+0.73	+0.73	+0.80	+0.79	+0.84	+0.81	+0.77	+0.74	+0.71	+0.77	+0.74	+0.76
	- % DK/NA	7	13	6	7	8	18	18	6	6	6	4	5	7	9	20	12	7	10
BIOTECHNOLOGY (**)	- Means	+0.70	+0.63	+0.72	+0.69	+0.65	+0.60	+0.64	+0.62	+0.63	+0.75	+0.73	+0.68	+0.65	+0.64	+0.64	+0.65	+0.68	+0.66
	- % DK/NA	24	35	26	25	27	38	41	28	22	18	24	19	26	30	37	32	24	30
GENETIC ENGINEERING (***)	- Means	+0.47	+0.43	+0.54	+0.49	+0.48	+0.31	+0.43	+0.45	+0.50	+0.41	+0.49	+0.50	+0.49	+0.42	+0.39	+0.46	+0.43	+0.45
	- % DK/NA	24	32	26	25	24	35	40	24	18	21	22	18	22	28	38	31	23	28
TELECOMMUNICATIONS	- Means	+0.86	+0.86	+0.85	+0.87	+0.89	+0.84	+0.85	+0.86	+0.88	+0.87	+0.88	+0.87	+0.86	+0.86	+0.84	+0.87	+0.84	+0.86
	- % DK/NA	7	12	7	5	8	16	16	6	6	5	5	5	5	8	16	11	6	9
NEW MATERIALS OR SUBSTANCES	- Means	+0.80	+0.71	+0.74	+0.79	+0.77	+0.72	+0.72	+0.76	+0.76	+0.80	+0.75	+0.81	+0.78	+0.72	+0.72	+0.73	+0.80	+0.76
	- % DK/NA	18	26	17	18	21	29	31	18	16	15	15	13	19	21	30	24	17	22
SPACE EXPLORATION	- Means	+0.53	+0.42	+0.60	+0.50	+0.47	+0.35	+0.41	+0.43	+0.52	+0.52	+0.59	+0.53	+0.47	+0.44	+0.38	+0.48	+0.45	+0.47
	- % DK/NA	16	23	15	17	19	26	28	16	17	14	11	13	16	19	27	22	15	20

(*) *Means are calculated by applying the coefficients +1, 0 and -1 to responses "will improve our way of life", "no effect" and "will make things worse"* respectively; the central point is therefore 0: below this point, negative responses predominate, and, above this point, positive responses. "Don't knows" are excluded from the calculation.

(**) This item was proposed to half (49%) of the sample; the other half was asked to evaluate genetic engineering.

(***) This item was proposed to half (51%) of the sample; the other half was asked to evaluate biotechnology.

(****) Quartiles in each country.

(*****) Response to the question : "Whether you do or you don't follow religious practices, would you say that you are : a) religious ; b) not religious ; c) an agnostic ; d) an atheist ; e) don't know.
In this table, the "religious" category includes responses a) and the "non-religious" category, responses b), c) and d).

Considering the influence of socio-demographic variables (cf Table 2), we note:

a) the means in the table are all generally positive: they vary between +0.31 and +0.89;

b) men are, in general, more optimistic than women with regard to the effects of new technologies on our way of life: mens' "global optimism" score is 4.13/6 and that of women 3.66. Men also tend to give a positive answer to the question, with fewer "don't knows": the global DK/NA ("Don't Know/No Answer") figure for men is just 0.77/6 compared to 1.17 for women;

c) in general, the younger one is, the more optimistic one is with regard to the effects of new technologies. "Global optimism" is a decreasing function of age: it runs from 4.21/6 among 15-24 year olds to 4.15 among 25-39s, 3.99 among 40-54 year olds and 3.37 among the over 54s. The number of "don't knows" also increases with age: only 0.77/6 among 15-24 year olds, it rises to 0.76 among 25-39s, 0.87 among 40-54 year olds and 1.38 among the over 54s;

d) on the whole, the "better educated" one is, the more optimistic one tends to be with respect to new technology[2]. "Global optimism" is a increasing function of educational level: it is 3.39/6 among those having finished full-time education before the age of 16, 3.95 among those having stopped between 16 and 17, 4.21 among those having continued to 18 or 19 and 4.30 among those having continued after 19 years of age.

We should emphasise, however, that individuals having continued their studies beyond 19 years of age are the least optimistic with regard to the effects of genetic engineering, whereas on the whole this group is the most optimistic with regard to biotechnology.

Table 3 : Breakdown of level of income* among the sample by sex, age, age at end of studies and "opinion leadership" (EC12 percentages)**

	SEX		AGE				AGE AT END OF STUDIES					OPINION LEADERSHIP				TOTAL EC 12
	M	F	15-24	25-39	40-54	55+	-16	16-17	18-19	20+	still studying	++ high	+	-	-- low	
LEVEL OF INCOME ++	21	15	18	24	25	9	8	19	24	36	17	28	22	15	9	18
LEVEL OF INCOME +	21	18	16	26	24	12	15	24	25	22	14	20	22	19	15	20
LEVEL OF INCOME -	20	19	15	21	18	21	23	21	19	14	11	19	18	19	21	19
LEVEL OF INCOME --	16	23	15	12	12	36	32	16	13	10	14	15	16	22	29	20
DK/NA/REFUSE	22	25	36	17	21	22	23	21	19	19	45	19	21	26	26	23
TOTAL	100	100	100	100	100	100	101	101	100	101	101	101	99	101	100	100

(*) Quartiles in each country.
(**) See Appendix 1.

Among those still studying (of all ages) the score is 4.35/6, a particularly high score but hardly surprising since this category combines two positive factors: youth and educational level (even if the category includes students aged 15 and whose educational level therefore falls into the lowest category, it also includes university-level students falling into the 20 years and above category). The level of "don't knows" also decreases with educational level: 1.49/6 among the less than 16s, it falls to 0.76 in the 16-17 years group, 0.68 for the 18-19s and 0.61 among the 20 years and over; among students of all ages, it is 0.62.

e) In general, level of income is a positive factor in influencing the judgement that people make of new technology. "Global optimism" ranges from 4.30/6 in the upper quartile to 4.10 in the mid-upper quartile, 3.85 in the mid-lower quartile and 3.41 in the lower quartile. With regard to the "don't knows", this is a negative function of income level, with 0.57, 0.75, 0.94 and 1.44 respectively in the upper, mid-upper, mid-lower and lower quartiles. These results can be explained to some extent by the fact that income levels are to a large extent a function of sex and educational level (cf Table 3), these factors having a positive correlation with both "global optimism" and the number of "don't knows" as we have seen above;

f) the means observed for "religious" individuals, independently of whether the individual concerned actually practices their religion (61% of our sample) differ only slightly from those for "non-religious", agnostic or atheist individuals. On the whole, nonetheless, "religious" individuals are slightly more optimistic with regard to the influence of new technology on our way of life (with a "global optimism" of 3.83/6) than the others ("global optimism" of 4.03). Regardless of the technology under consideration, they are also less likely to express their viewpoint; the number of "don't knows" is 1.09/6 among "religious" individuals versus 0.72 among the rest.

"Global optimism" and the incidence of "don't knows" are also strongly correlated[3] with the principal source of information on "new developments that affect our way of life" used by the person interviewed. The importance of these different sources is summarised below[4]:

Principal Source	Optimism	DK/NA
Specialist press	4.31/6	0.44/6
Books	4.26	0.55
Courses and lectures	4.24	0.43
Company brochures and advertisements	4.09	0.66
Newspapers	4.08	0.75
Magazines and weeklies	4.00	0.82
Television	3.84	1.08
Discussions with friends, family and colleagues	3.74	0.94
- Radio	3.71	1.15
One's doctor	3.43	0.70
Shopkeepers when buying something	2.79	152

[3] **In** this correlation, the two variables exert a strongly mutually reciprocal influence. Attempting to distinguish the dependent and independent variables, however, is very much a case of the separating the chicken from the egg.

[4] The reader can find a more detailed treatment of this question in Chapter 4.

Chapter 2: "Objective" and "Subjective" Knowledge of Biotechnology / Genetic Engineering

Chapter 2: "Objective" and "Subjective" Knowledge of Biotechnology / Genetic Engineering

2.1 "Objective" Knowledge

In order to "measure" "objectively" the knowledge that Europeans have of biotechnology / genetic engineering, members of the sample were asked to identify from a list of seven topics which ones actually concerned biotechnology / genetic engineering[1] (cf Tables 4 and 5).

The correct response being "yes" for all seven items for both biotechnology and genetic engineering, the number of affirmative responses gives a crude indication of the degree of objective understanding which ranges from 0 to 7.

At Community level, we derive the following results:

> The index of "objective" knowledge is 4.16/7 for the biotechnology sub-sample, and 4.02 for the genetic engineering sub-sample, in other words 4.09 across the whole sample. According to our "definition" of "objective" knowledge, applications of biotechnology are therefore slightly better known than those of genetic engineering.

[1] Remember that half the sample were presented with questions on biotechnology and the other half with questions on genetic engineering.

Table 4 : "Objective" knowledge of different applications of biotechnology/genetic engineering* (Percentages and means for EC12)

QUESTION : I have here a list of some developments where new technologies are actually developed. In your opinion, which of these are linked to biotechnology and genetic engineering and which are not ?

ITEM 1: Research on early detection and treatment of cancer.

ITEM 2: Changing hereditary information within an organism to alter that organism's characteristics.

ITEM 3: Producing new kinds of organisms using hereditary information from other species.

ITEM 4: Improving traditional methods of cross-breeding plants or animals.

ITEM 5: Making use of living micro-organisms, for example for plant protection (bio-pesticides).

ITEM 6: Food processing such as using yeast for the production of bread or beer.

ITEM 7: Treating hereditary human diseases by modifying the tissue involved.

		BIOTECH-NOLOGY	GENETIC ENGINEER.	TOTAL
ITEM 1	- Yes	67	60	63
	- No	10	16	13
	- DK/NA	24	24	24
ITEM 2	- Yes	57	68	63
	- No	14	9	11
	- DK/NA	28	23	26
ITEM 3	- Yes	56	62	59
	- No	14	11	13
	- DK/NA	30	27	29
ITEM 4	- Yes	59	57	58
	- No	14	16	15
	- DK/NA	27	27	27
ITEM 5	- Yes	63	49	56
	- No	10	19	15
	- DK/NA	27	31	29
ITEM 6	- Yes	53	38	45
	- No	18	30	24
	- DK/NA	29	32	30
ITEM 7	- Yes	61	68	65
	- No	10	7	9
	- DK/NA	28	25	27
MEANS (**)	- Yes	4.16	4.02	4.09
	- No	0.90	1.09	0.99
	- DK/NA	1.92	1.87	1.90

(*) The term "biotechnology" was proposed to half (49%) of the sample and the term "genetic engineering" to the other half (51%). The table below shows results for the EC12 relative to these two sub-samples, as well as for the total sample.
The question asked is a question of knowledge. For all seven items proposed, the correct response is "yes".

(**) The three means indicate the number of "yes", "no" and "don't know" responses respectively, and vary thus from 0 to 7. A mean of 7 "yes" responses is a completely correct answer.

Although this method offers the advantage of providing a synthetic indicator of the answers given to the seven items proposed, it also has the major disadvantage (like all averages), however, that it provides no indication of the distribution of answers to the question. The very small difference that it shows between the results for biotechnology / genetic engineering, for example, masks a statistically significant divergence between the results for the two definitions for six of the seven items[2] which tends to favour biotechnology in some respects and genetic engineering in others.

Item 6 ("food processing such as using yeast for the production of bread or beer") shows the clearest divergence between the two definitions. We also note that in the two sub-samples this item is the least "known".

The percentage of individuals having a knowledge index of 7/7 (i.e. completely correct) is 24% in the biotechnology sub-sample and 19% in the genetic engineering sub-sample, in other words 21% overall. This corroborates the view that applications of biotechnology are slightly better known than those of genetic engineering.

Regardless of the item under consideration, the number of "don't knows" is very high (23% and above). This figure changes very little between the two sub-samples: it is on average 28% for biotechnology and 27% for genetic engineering.

The "awareness" (or percentage of "yes" responses) of the different items depends on the item under consideration, especially in the genetic engineering sub-sample, where the range of possible answers runs from 38% to 68%.

[2] The only item for which there is no significant difference is item 4, concerning the "improvement of traditional methods of cross-breeding plants or animals".

Table 5 : "Objective" knowledge of different applications of biotechnology/genetic engineering* (National breakdown of percentages and means)

QUESTION : cf. table 4.

BIO. = BIOTECHNOLOGY		B		DK		D-WEST		D-OST		D-GESAMT		GR		E	
G.E. = GENETIC ENGINEERING		BIO.	G.E.	BIO.	G.E.	BIO.	G.E.	BIO.	G.E.	BIO.	G.E.	BIO.	G.E.	BIO.	G.E.
ITEM 1	- Yes	68	60	58	32	75	73	79	74	76	73	42	40	53	50
	- No	10	18	21	46	8	11	11	13	9	11	10	12	5	10
	- DK/NA	22	22	22	22	17	16	10	13	16	16	48	47	43	40
ITEM 2	- Yes	63	71	69	84	72	80	63	80	70	80	37	42	45	51
	- No	11	8	14	7	10	6	20	4	12	6	11	9	10	8
	- DK/NA	26	22	17	10	18	14	16	16	17	15	52	49	46	41
ITEM 3	- Yes	55	62	67	79	70	75	57	71	67	74	36	39	45	51
	- No	14	10	13	12	10	6	20	9	12	7	8	9	9	9
	- DK/NA	31	28	20	10	21	19	23	20	21	19	55	52	46	26
ITEM 4	- Yes	63	58	80	83	70	68	67	65	69	67	45	42	46	45
	- No	12	13	8	10	13	11	15	15	13	12	6	9	8	11
	- DK/NA	25	30	13	7	18	21	18	20	18	21	49	49	46	45
ITEM 5	- Yes	61	49	72	56	70	62	77	51	72	59	44	38	45	41
	- No	13	17	9	21	10	13	9	22	10	15	7	10	8	11
	- DK/NA	26	34	19	23	20	26	14	27	18	26	49	52	47	48
ITEM 6	- Yes	53	36	61	46	62	47	74	44	64	46	37	35	40	29
	- No	17	27	16	32	18	24	10	33	17	26	12	13	14	24
	- DK/NA	30	37	22	22	20	29	16	24	19	28	51	52	47	46
ITEM 7	- Yes	63	69	65	64	70	79	65	79	69	79	42	45	52	53
	- No	10	10	14	18	9	6	15	5	10	6	7	5	4	5
	- DK/NA	27	22	22	18	21	15	20	17	21	16	51	50	44	42
MEANS (**)	- Yes	4.26	4.04	4.71	4.43	4.88	4.83	4.81	4.63	4.87	4.79	2.84	2.81	3.24	3.20
	- No	0.86	1.02	0.94	1.46	0.78	0.77	1.00	1.01	0.83	0.82	0.61	0.67	0.58	0.78
	- DK/NA	1.85	1.92	1.32	1.09	1.32	1.37	1.06	1.28	1.26	1.35	3.54	3.52	3.18	3.02

BIO. = BIOTECHNOLOGY		F		IRL		I		L		NL		P		UK	
G.E. = GENETIC ENGINEERING		BIO.	G.E.	BIO.	G.E.	BIO.	G.E.	BIO.	G.E.	BIO.	G.E.	BIO.	G.E.	BIO.	G.E.
ITEM 1	- Yes	68	64	68	62	62	53	58	49	66	65	43	46	74	59
	- No	13	18	6	10	12	21	17	31	14	15	6	7	7	20
	- DK/NA	19	19	26	28	26	26	25	20	21	21	51	47	18	21
ITEM 2	- Yes	57	69	42	48	52	68	56	71	69	73	35	41	57	68
	- No	19	10	16	12	18	11	23	12	12	7	9	8	16	10
	- DK/NA	24	22	43	40	31	22	21	17	19	19	55	52	28	21
ITEM 3	- Yes	58	59	46	51	49	61	50	62	67	66	34	38	56	63
	- No	17	15	13	10	17	12	28	17	12	11	8	8	16	15
	- DK/NA	25	26	41	39	34	26	22	21	21	23	57	54	27	22
ITEM 4	- Yes	61	53	52	51	53	54	52	62	69	58	38	41	61	58
	- No	17	22	14	14	17	17	22	18	13	16	6	8	15	22
	- DK/NA	22	25	34	35	29	29	26	21	18	26	56	51	24	20
ITEM 5	- Yes	62	49	52	45	58	46	54	51	76	46	40	35	70	49
	- No	13	20	10	14	12	24	20	23	10	29	4	10	8	26
	- DK/NA	25	30	38	41	30	30	26	26	14	25	56	55	22	25
ITEM 6	- Yes	57	43	47	40	43	34	47	40	61	32	31	32	57	33
	- No	19	29	16	22	26	36	29	37	21	40	10	13	18	39
	- DK/NA	25	28	37	38	31	30	24	23	18	28	59	54	25	28
ITEM 7	- Yes	67	70	53	53	54	64	55	72	68	75	36	42	65	72
	- No	13	7	8	10	14	9	18	11	12	7	6	6	10	9
	- DK/NA	21	23	39	38	32	26	27	16	20	18	58	52	25	20
MEANS (**)	- Yes	4.30	4.07	3.61	3.50	3.71	3.79	3.72	4.07	4.76	4.15	2.58	2.75	4.40	4.02
	- No	1.10	1.21	0.82	0.91	1.15	1.30	1.58	1.49	0.94	1.25	0.49	0.59	0.90	1.41
	- DK/NA	1.60	1.72	2.57	2.59	2.12	1.90	1.68	1.44	1.30	1.60	3.92	3.65	1.66	1.55

(*) The term "biotechnology" was proposed to half (49%) of the sample and the term "genetic engineering" to the other half (51%). The table below shows results for the EC12 relative to these two sub-samples.
The question asked is a question of knowledge. For all seven items proposed, the corect response is "yes".

(**) The three means indicate the number of "yes", "no" and "don't know" responses respectively, and vary thus from 0 to 7. A mean of 7 "yes" responses is a completely correct answer.

At national level we see that:

In the two sub-samples, the "objective" knowledge index varies strongly from country to country:

* for the biotechnology sub-sample, it is less than 2.85/7 in Portugal and Greece, but above 4.7 in both German republics, the Netherlands and Denmark;
* for the genetic engineering sub-sample, it is less than 2.85/7 in Portugal and Greece, but above 4.6 in the ex-Federal and Democratic Republics of Germany.

The national distribution of this index is shown in Graph 3.

Within the same country, the "awareness" of the different applications also varies considerably from item to item. This is particularly striking in the genetic engineering sub-sample in Denmark (Denmark, after Germany, is nonetheless the best "informed" country - cf. Graph 3), where the "awareness" for item 1 is just 32% (compared to an EC12 average of 60%!) versus 84% for item 2 (EC12 average: 68%).

In both sub-samples, the mean number of "don't knows" varies enormously by country. For the total sample, the breakdown is:

ex-GDR	1.17/7
Denmark	1.21
Germany (Combined Scores)	1.31
ex-FRG	1.35
Netherlands	1.45
Luxembourg	1.56
United Kingdom	1.61
France	1.67
Belgium	1.88
EC12	1.90
Italy	2.00
Ireland	2.58
Spain	3.10
Greece	3.53
Portugal	3.79

Table 6 : "Objective" knowledge of different applications of biotechnology/genetic engineering* (breakdown of EC12 means by various socio-demographic and socio-political variables)

QUESTION : cf.table 4.

BIO. = SUB-SAMPLE BIOTECHNOLOGY G.E. = SUB-SAMPLE GENETIC ENGINEERING TOTAL = BIO. + G.E.			SEX		AGE				AGE AT END OF STUDIES					TOTAL EC 12
			M	F	15-24	25-39	40-54	55+	-16	16-17	18-19	20+	still studying	
BIO.	(**)	- Means of "Yes"	4.38	3.95	4.42	4.46	4.27	3.65	3.25	4.54	4.58	5.01	4.66	4.16
		- Means of "No"	0.96	0.84	1.13	1.00	0.84	0.70	0.71	0.94	1.00	1.00	1.17	0.90
		- Means of "DK/NA"	1.63	2.19	1.42	1.52	1.86	2.63	3.01	1.49	1.39	0.98	1.13	1.92
G.E.	(**)	- Means of "Yes"	4.20	3.86	3.99	4.42	4.24	3.52	3.27	4.26	4.49	4.85	4.17	4.02
		- Means of "No"	1.15	1.03	1.35	1.19	1.02	0.89	0.86	1.12	1.20	1.19	1.53	1.09
		- Means of "DK/NA"	1.63	2.09	1.67	1.38	1.71	2.57	2.85	1.61	1.29	0.96	1.30	1.87
TOTAL	(**)	- Means of "Yes"	4.29	3.90	4.22	4.44	4.25	3.58	3.26	4.39	4.53	4.92	4.42	4.09
		- Means of "No"	1.06	0.94	1.23	1.10	0.93	0.80	0.78	1.03	1.10	1.10	1.35	0.99
		- Means of "DK/NA"	1.63	2.14	1.53	1.45	1.78	2.60	2.93	1.56	1.34	0.97	1.22	1.90

BIO. = SUB-SAMPLE BIOTECHNOLOGY G.E. = SUB-SAMPLE GENETIC ENGINEERING TOTAL = BIO. + G.E.			OPINION LEADERSHIP (***)				LEVEL OF INCOME (****)				RELIGIOSITY (*****)		TOTAL EC 12
			++ high	+	-	-- low	++ high	+	-	-- low	Religious	Non religious	
BIO.	(**)	- Means of "Yes"	4.89	4.61	3.99	2.98	5.02	4.44	4.09	3.63	3.92	4.67	4.16
		- Means of "No"	0.90	0.94	0.87	0.87	1.01	0.91	0.83	0.84	0.89	0.95	0.90
		- Means of "DK/NA"	1.17	1.42	2.14	3.12	0.96	1.62	2.05	2.50	2.18	1.35	1.92
G.E.	(**)	- Means of "Yes"	4.91	4.27	3.93	3.02	4.77	4.43	3.91	3.45	3.81	4.43	4.02
		- Means of "No"	1.05	1.20	1.05	0.92	1.23	1.14	1.08	0.92	1.07	1.13	1.09
		- Means of "DK/NA"	1.02	1.51	2.00	3.04	0.99	1.41	2.00	2.61	2.10	1.43	1.87
TOTAL	(**)	- Means of "Yes"	4.90	4.44	3.96	3.00	4.88	4.44	4.01	3.54	3.86	4.55	4.09
		- Means of "No"	0.98	1.07	0.96	0.98	1.13	1.03	0.95	0.88	0.98	1.04	0.99
		- Means of "DK/NA"	1.09	1.47	2.07	3.08	0.97	1.51	2.03	2.56	2.14	1.39	1.90

(*) The term "biotechnology" was proposed to half (49%) of the sample and the term "genetic engineering" to the other half (51%). The table below shows results for the EC12 relative to these two sub-samples, as well as for the total sample.
The question asked is a question of knowledge. For all seven items proposed, the correct response is "yes".

(**) The three means indicate the number of "yes", "no" and "don't know" responses respectively, and vary thus from 0 to 7. A mean of 7 "yes" responses is a completely correct answer.

(***) See Appendix 1.

(****) Quartiles in each country.

(*****) Response to the question : "Whether you do or you don't follow religious practices, would you say that you are : a) religious ; b) not religious ; c) an agnostic ; d) an atheist ; e) don't know.
In this table, the "religious" category includes responses a) and the "non-religious" category, responses b), c) and d).

In other words a similar breakdown, on the whole, to the "objective" knowledge index (cf. Graph 3).

Except for Portugal and, above all, Luxembourg, the knowledge index for biotechnology is either higher than or not significantly different from that for genetic engineering.

The impact of socio-demographic and socio-political variables on this "objective" knowledge index (cf. Table 6) is as follows:

regardless of whether we consider biotechnology or genetic engineering, "objective" knowledge is higher (and the number of "don't knows" lower) among men than among women;

knowledge of biotechnology tends to decrease with age, and the average number of "don't knows" tends to increase. Knowledge of genetic engineering is highest (and the number of "don't knows" the lowest) among 25-39 year olds; above 39 years knowledge tends to decrease and uncertainty increases. Note, however, that knowledge of genetic engineering issues among 15 to 24 year olds is less than that of both 25-39 and 40-54 year olds;

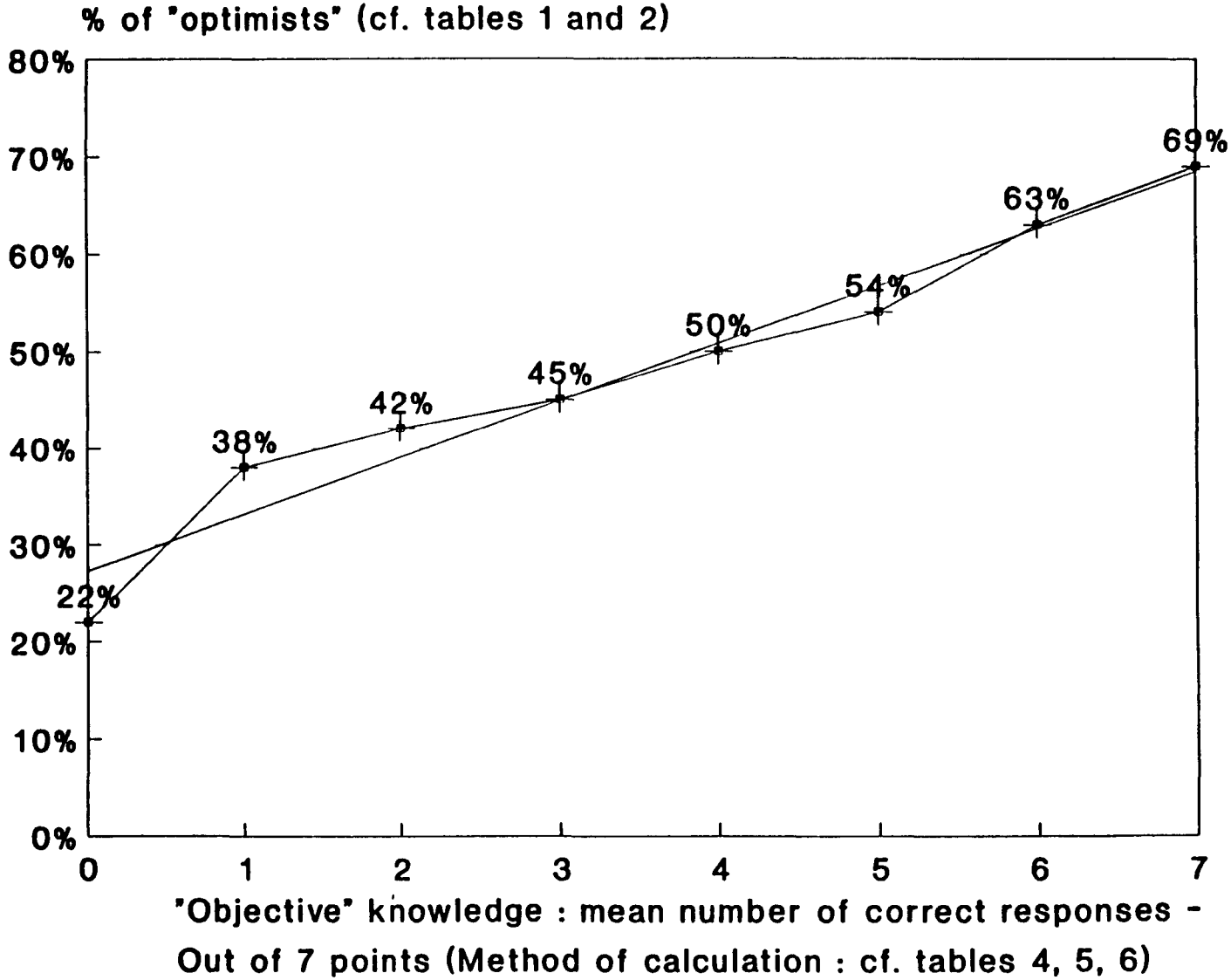
knowledge of biotechnology and of genetic engineering increases (and the number of "don't knows" decreases) with educational level;

as one might expect, opinion leaders (as defined in Appendix 1) are much better informed on biotechnology / genetic engineering than other people, and are more likely to express an opinion on the subject;

knowledge of biotechnology and of genetic engineering increases (and the number of "don't knows" decreases) with income level. This is hardly surprising given the relationship of income level with sex, age, educational level and opinion leadership (cf. supra Table 3 and point (e) on page 17);

in both biotechnology / genetic engineering, knowledge is higher (and the number of "don't knows" lower) among "non-religious" individuals than among "religious" individuals.

Graph 2: Optimism with regard to biotec./genetic engineering and "objective" knowledge - what relationship ? (EC12)



Before concluding this section, we should also point out two particularly interesting results in the context of the objectives of this study (cf. Introduction).

The first is that, as Graph 2 shows, "optimism" with respect to biotechnology / genetic engineering ("will improve our way of life in the next 20 years": cf Chapter 1) is a positive function of "objective" knowledge one has of the subject.

Among the 21% of people having replied correctly to the seven items proposed, this degree of optimism reaches 69%. The results in fact show that, among this sub-group:

> 7% believe that biotechnology / genetic engineering will have "no effect";
>
> 9% believe that biotechnology / genetic engineering "will make things worse";
>
> 14% "don't know".

Even though this positive relation is quite clear and almost perfect (closely following the trend), we should also point out that, on average, the level of objective knowledge of "pessimists" (those believing that biotechnology / genetic engineering "will make things worse") is only very slightly lower than that of the "optimists" (4.42/7 for the "pessimists" compared to 4.80/7 for the "optimists").

To be precise, the breakdown of this knowledge among former and latter is:

Knowledge	**Optimists**	**Pessimists**
0/7	6%	5%
1/7	3	4
2/7	5	6
3/7	10	14
4/7	16	21
5/7	16	17
6/7	15	15
7/7	29	18

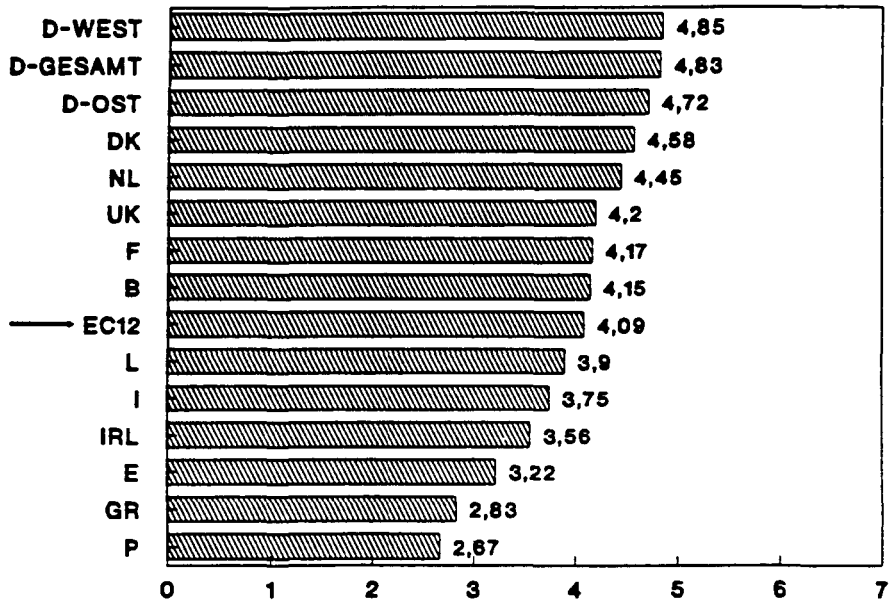
Table 7 : Relationship between "objective" knowledge of persons interviewed and their principal source of information on "new developments that affect our way of life"

MAIN SOURCE	KNOWLEDGE
Specialist press	5.26/7
Company brochures and advertisements	4.93
Magazines/weeklies	4.79
Books	4.77
Courses and lectures	4.55
Newspapers	4.47
One's doctor	4.26
Discussions with friends, family, colleagues	3.95
Radio	3.85
Television	3.83
Shopkeepers when buying something	3.52

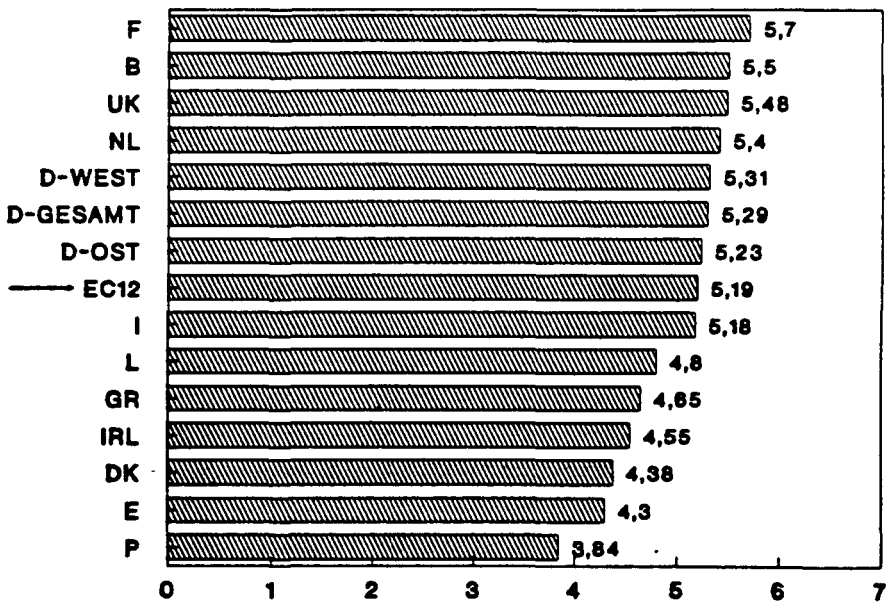
The second result is that, as one might expect, "objective" knowledge is closely correlated with the principal source of information that people in the sample use to obtain information on "new developments that affect our way of life (cf. Table 7 and note (3) on page 18 of Chapter 1).

Graph 3 : "Objective" and "subjective" evaluation of one's knowledge of biotechnology/genetic engineering (by country)

"Objective" evaluation : mean number of correct responses - Out of 7 points (Method of calculation: cf. tables 4, 5, 6)



Mean "subjective" evaluation : 1= felt completely incapable of responding to the questions asked; 10= completely capable



2.2 "Subjective" Knowledge

"Subjective" knowledge of biotechnology / genetic engineering among the sample interviewed was determined from the responses to a question asked at the end of the questionnaire (cf. Appendix 3).

"How capable did you feel of answering the questions I asked you about biotechnology / genetic engineering? Please answer using this scale from 1 to 10. ONE means "completely incapable" and TEN "completely capable". Please use the full scale of numbers."

At Community level, the breakdown of responses is as shown below:

Completely incapable	8	7	11	12	20	13	12	9	4	5	Completely capable

As Graph 3 shows, average subjective knowledge throughout the Community is below the median of the scale (5.50), with the exception of Belgium, which lies on this mid-point, and France, where it is slightly above. Means per country vary between 3.84/10 (Portugal) and 5.70 (France).

This subjective knowledge varies according to various socio-demographic and socio-political variables:

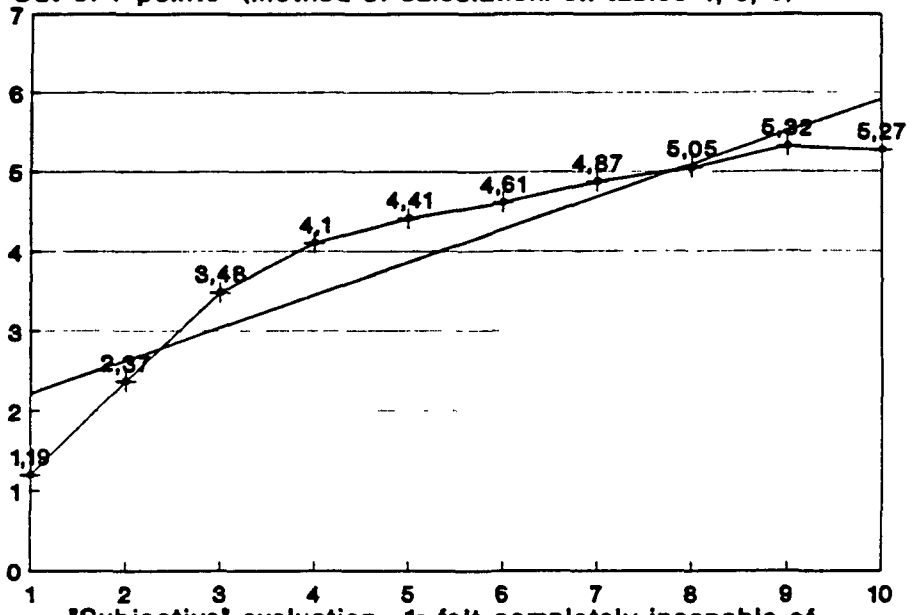
sex: 5.50 among men and 4.91 among women;

age: 5.49 for 15-24 and 25-39 year olds, 5.36 among 40-54 year olds and 4.62 for the over 54s;

educational level: 4.35 among those having ended their studies below the age of 16,5.31 among those having stopped between 16 and 17 years, 5.75 among those ending between 18 and 19 and 6.03 among those continuing beyond 19 years;

Graph 4 : "Objective" and "subjective" evaluation of one's knowledge of biotec./gen. engin. - what relationship? (EC12)

"Objective" evaluation : mean number of correct responses - Out of 7 points (Method of calculation: cf. tables 4, 5, 6)



"Subjective" evaluation : 1= felt completely incapable of responding to the questions asked; 10= completely capable

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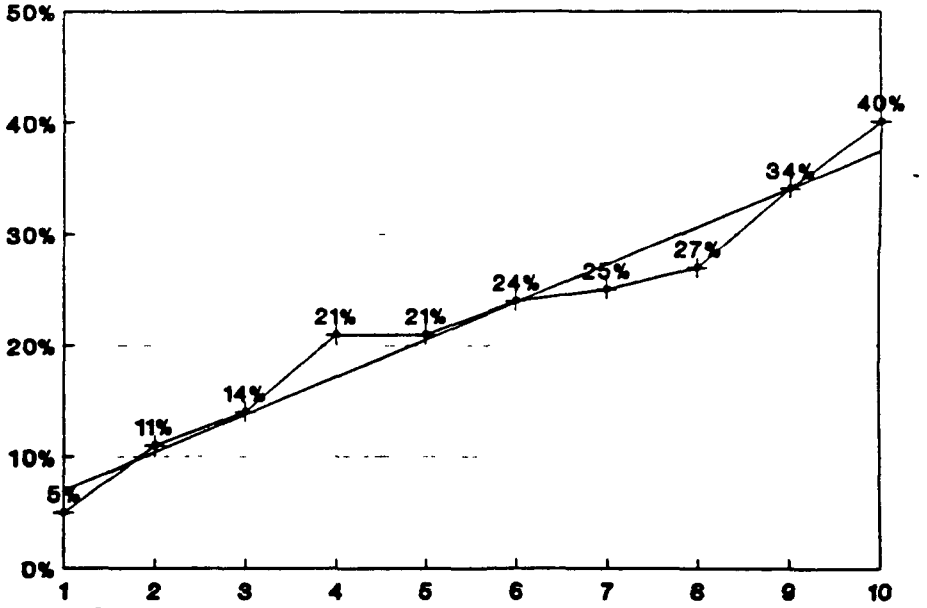
"Objective" eval.: % of individuals having correctly responded to all 7 questions, i.e. having a result of 7 out of 7



"Subjective" evaluation : 1= felt completely incapable of responding to the questions asked ; 10= completely capable

income level: 5.97 in the upper quartile, 550 in the mid-upper quartile, 5.03 in the mid-lower quartile and 4.59 in the lower quartile;

"opinion leaders" (as defined in Appendix I): 6.05 in the upper quartile, 556 in the mid-upper quartile, 5.03 in the mid-lower quartile and 4.08 in the lower quartile;

"religious" attitudes: 5.04 among those considering themselves "religious", independently of whether they actually practice their religion, and 552 among those believing themselves to be "non-religious", agnostic or atheist.

These socio-demographic and socio-political variables therefore all act in the same sense.

This result is explained partly by the fact that, as Graph 4 shows, people interviewed tend, on the whole, to make a realistic evaluation of their knowledge of the subject.

This is, of course, very encouraging for those wishing to promote a policy of information on the subject, given that:

"the trouble with people is not that they don't know, but that they know so much that ain't so"[3].

[3] Henry Wheeler Shaw (1874): "Josh Billings' Encyclopedia of Wit and Wisdom".

Chapter 3: Attitudes with regard to Different Applications of Biotechnology / Genetic Engineering

Chapter 3: Attitudes towards Different Applications of Biotechnology / Genetic Engineering

In this chapter we will analyse the attitudes of European with regard to different types of biotechnology/ genetic engineering research. These concern specifically:

plants;

micro-organisms such as yeast used to make bread, beer **or** yoghurt;

micro-organisms used to break down sewage and other waste products and to turn them into materials harmless to the soil;

farm animals;

food processing;

pharmaceuticals;

the human body.

To do this, for each area we ask three fundamental questions:

is such research worthwhile and should it be encouraged;

does such research involve risks to human health or to the environment;

does this research need to be controlled by the government.

Tables 8a and 8b : Types of biotechnology/genetic engineering research that are "worthwhile and should be encouraged"

QUESTIONS : 1 would like to ask your opinion about come examples of biotechnology/genetic engineering research :

1} Let us start with an example concerning plants.
Scientists are trying to use biotechnology/genetic engineering to change plants, in Mays that way be quicker or more precise than traditional breeding programs, in order to wake the plants more useful.
For example, Bake then resistant to diseases or pests. Bake them ripen faster or give them the ability to grow in dry or salty soils.
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement : such research on plants is worthwhile and should be **encouraged. (PLANTS)**

2) Here is an example concerning micro-organisms, such as the yeast we use to make bread, or beer, or yoghurt ; or the micro-fungi we use to sake medicines such as penicillin.
Scientists know how to change these micro-organisms through biotechnology/genetic engineering, in order to improve their performance • that means, getting then to work faster or even to produce new products.
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement : such research on these micro-organisms is worthwhile and should be encouraged. ("A- MICRO-ORGANISMS)

3) Some of these micro-organisms are used to break down sewage and other waste products and to turn them into materials harmless to the soil.
Here again, scientists are trying, through biotechnology/genetic engineering, to improve these micro-organisms.
They are trying to make them work faster or to make them clean up oil-slicks or other contaminants in the environment.
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement : such research on these micro-organisms is worthwhile and should be encouraged. ("B" MICRO-ORGANISMS)

4) Another development is the application of biotechnology/genetic engineering to farm animals, to change them in quicker or more precise ways than traditional breeding programs, in order to make them more useful: for example, make them resistant to diseases, or grow faster, or produce more or better quality meat or milk.
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement : such research on farm animals is worthwhile and should be encouraged. (FARM ANIMALS)

5) These news methods of biotechnology/genetic engineering are also being applied to the production and processing of foods. Scientists say that they can improve the quality of food and drink • for example, by making it higher in protein, or lower in fat, or making it keep longer, or taste better.
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement : such research on food is worthwhile and should be encouraged. (FOOD)

6) Yet another application of biotechnology/genetic engineering is the development of new medicines and vaccines to improve human health, for example the production of human insulin for the treatment of diabetics.
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement : such research on medicines and vaccines is worthwhile and should be encouraged. (MEDICINES/VACCINES)

7) Science is also trying to apply some of the new methods of biotechnology/genetic engineering to human beings, or to their cells and their tissues, for various purposes such as detecting, *or* curing diseases, and characteristics we might have inherited free our parents.
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement : such research on human beings is worthwhile and should be encouraged. (HUMAN BEINGS)

Table 8a : Percentages and means for EC12

	Agree ++	Agree +	Disagree -	Disagree --	DK/NA	TOTAL	Means (*)
PLANTS	41	33	11	7	9	101	+0.98
"A" MICRO-ORGANISMS	44	34	8	4	10	100	+1.17
"B" MICRO-ORGANISMS	63	24	3	2	9	101	+1.57
FARM ANIMALS	21	21	24	24	9	99	-0.10
FOOD	29	29	19	13	10	100	+0.47
MEDICINES/VACCINES	63	25	3	1	7	99	+1.59
HUMAN BEINGS	44	30	9	7	10	100	+1.04

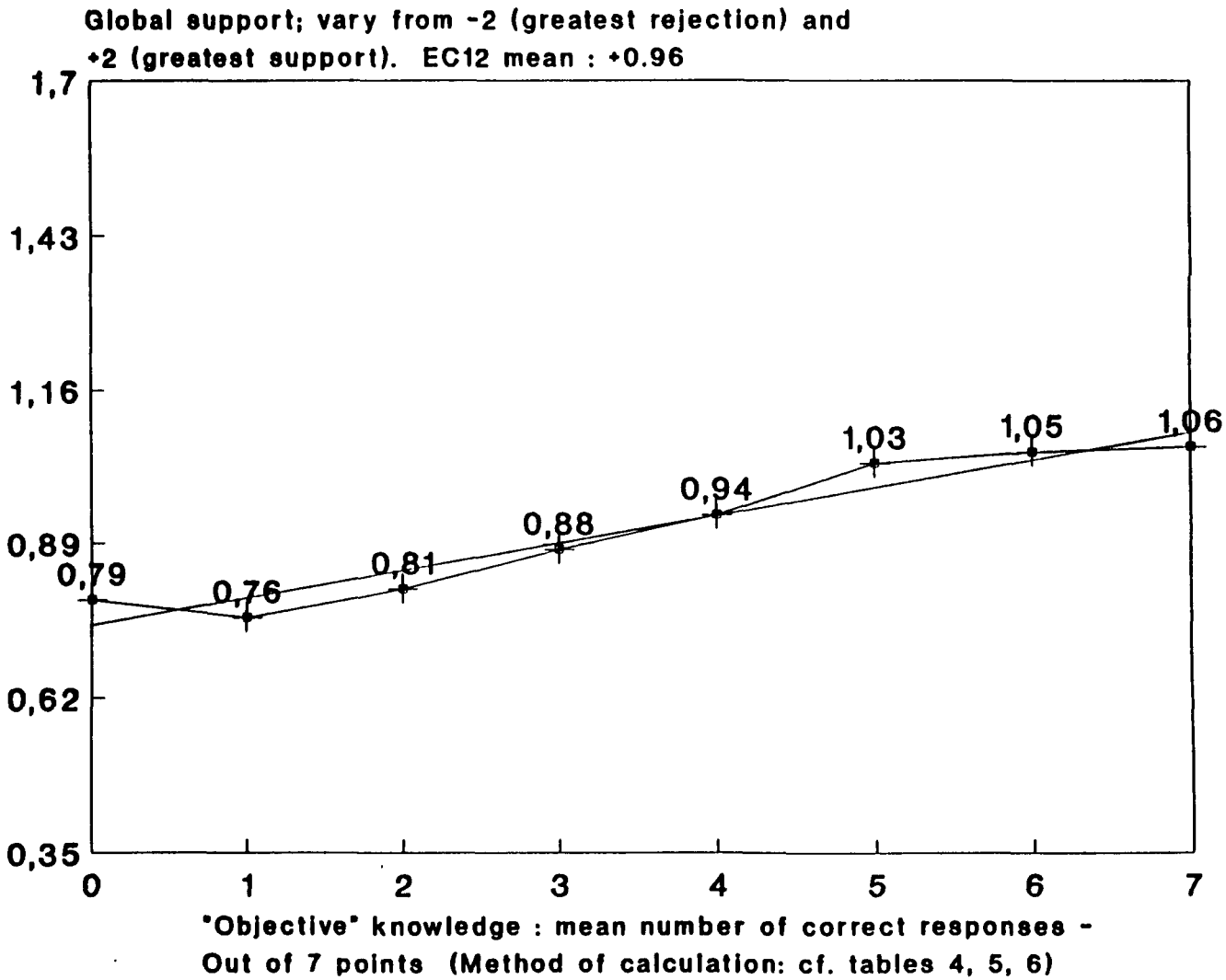
Table 8b : National breakdown of "don't knows" (%) and means

1st column : Means (*) 2nd column : % of DK/NA	B		DK		D-WEST		D-OST		D-GESAMT		GR		E		EC12	
	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?
PLANTS	+1.08	10	+0.98	3	+0.84	8	+1.36	5	+0.95	7	+0.65	12	+1.11	18	+0.98	9
"A" MICRO-ORGANISMS	+1.17	12	+1.33	6	+0.97	9	+1.46	6	+1.07	9	+0.98	17	+1.19	20	+1.17	10
"B" MICRO-ORGANISMS	+1.56	10	+1.65	3	+1.47	7	+1.72	5	+1.53	7	+1.63	13	+1.47	21	+1.57	9
FARM ANIMALS	-0.03	10	-0.16	4	-0.36	8	+0.41	6	-0.20	7	+0.33	13	+0.22	17	-0.10	9
FOOD	+0.86	10	+0.37	4	+0.11	10	+0.85	5	+0.27	9	+0.62	15	+0.68	18	+0.47	10
MEDICINES/VACCINES	+1.52	8	+1.70	2	+1.40	7	+1.73	3	+1.47	6	+1.77	10	+1.60	14	+1.59	7
HUMAN BEINGS	+1.11	10	+1.06	4	+0.49	10	+0.98	6	+0.59	9	+1.44	12	+1.29	19	+1.04	10

1st column : Means (*) 2nd column : % of DK/NA	F		IRL		I		L		NL		P		UK		EC12	
	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?
PLANTS	+0.88	6	+1.10	13	+0.87	8	+0.44	10	+1.02	8	+1.36	27	+1.12	4	+0.98	9
"A" MICRO-ORGANISMS	+1.26	8	+1.36	15	+1.11	10	+0.78	12	+1.29	9	+1.49	30	+1.23	5	+1.17	10
"B" MICRO-ORGANISMS	+1.60	5	+1.55	13	+1.54	7	+1.19	10	+1.73	7	+1.70	25	+1.63	5	+1.57	9
FARM ANIMALS	-0.27	6	+0.21	16	+0.04	9	-0.71	9	-0.63	8	+0.71	25	-0.20	6	-0.10	10
FOOD	+0.52	6	+0.81	14	+0.43	11	+0.04	10	+0.74	9	+1.18	30	+0.38	5	+0.47	9
MEDICINES/VACCINES	+1.62	5	+1.64	9	+1.60	8	+1.30	8	+1.68	6	+1.77	25	+1.61	4	+1.59	7
HUMAN BEINGS	+1.30	6	+1.30	14	+1.08	11	+0.47	11	+1.08	9	+1.57	31	+1.09	6	+1.04	10

(*) These means are calculated by applying the coefficients +2, +1, -1 and -2 to the responses "definitely agree", "tend to agree", "tend to disagree" and "definitely disagree" respectively; the central point is therefore 0 : below this point, negative responses predominate, and above, positive responses. "Don't knows" are excluded from the calculation.

Graph 5 : "Objective" knowledge of biotechnology/genetic engineering and global support for their applications - What relationship ? (EC12)



3.1 Support for Different Applications

The first result to come out of tables 8a and 8b is that, with the exception of applications into farm animals, all the responses presented are positive. Among the seven different types of biotechnology / genetic engineering research discussed in the questionnaire, six therefore receive the support of Europeans to a greater or lesser degree.

At Community level, the most significant observations are:

the levels of support for the different kinds of biotechnology / genetic engineering research (in other words where the respondent indicates that they "definitely agree" or "tend to agree" that "such research is worthwhile and should be encouraged") vary considerably with the type of research under consideration. Although it falls to just 42% for applications concerning farm animals (we note with interest that this is the only application to be rejected by more people - 49% of those interviewed - than supported) and to 58% for food research, it reaches 87% for research "micro-organisms" used to break down sewage and other waste products and to turn them into materials harmless to the soil" (""B" micro-organisms"[1]) and 88% for research into "the development of new medicines / vaccines to improve human health";

in parallel with the levels of support or rejection that they represent, the mean scores also vary within a broad range of values: from -0.10 (farm animals) and +0.47 (food research) to +157 ("B" micro-organisms) and +159 (medicines / vaccines);

the "global support indicator", in other words the mean of the seven means for each type of application under analysis is roughly

[1] These are called ""B" micro-organisms", as opposed to other types of micro-organisms mentioned in the questionnaire and which are termed ""A" micro-organisms", only in the interest of simplifying the report. This terminology has no other purpose and does not correspond to any official definition.

+1 (+0.96), which corresponds to a response that the total sample "tends to agree" that "such research is worthwhile and should be encouraged". As Graph 5 shows, this index is a positive function of "objective" knowledge of biotechnology / genetic engineering (as defined in Chapter 2): on average, the more that the interviewed person knows about applications of biotechnology/ genetic engineering, more they tend to support research in this area;

the number of "don't knows" ranges from 7% to 10%, in other words a relatively low figure, particularly when compared with the results discussed in Chapters 1 and 2.

At the level of each national sub-sample:

as in the case of total Community sample, the majority of national means (90 out of 98) are positive, and the few negative responses that do exist (such as Luxembourg, the lowest with -0.71, which constitutes a clear rejection of the application) only concern applications of biotechnology / genetic engineering to farm animals. Furthermore, in Portugal (with +0.71!), ex-GDR, Greece, Spain, Ireland and Italy (+0.04), even the means for farm animal research are positive;

regardless of the country under consideration, support for research into "B" micro-organisms and into medicines / vaccines is massive. The means for this research area vary only slightly: +1.19 (in Luxembourg) to +1.72 (in ex-GDR) and +1.73 (in the Netherlands) for the first area; and from +1.30 (in Luxembourg) to +1.77 (in Greece and Portugal) for the latter. Out of these specific research areas, support for different types of applications varies strongly from one country to another, especially for research into food processing where, for example, the mean for Luxembourg is barely positive (+0.04) and in Portugal it is above +1(+1.18);

support for different applications of biotechnology/ genetic engineering is much stronger in the ex-Democratic Republic of Germany than in the former Federal Republic; this is particularly striking when considering biotechnology / genetic engineering research into farm animals (-036 in the West compared to +0.41

in the ex-Democratic Republic). This result is hardly surprising, however, given the higher degree of "optimism" with respect to biotechnology / genetic engineering in the ex-Democratic Republic (cf. Chapter 1);

the "global support indicator" (which can range from -2 to +2) and the average number of "don't knows" (in percent) depends to a large extent on the country being considered:

	Country	Support	DK/NA
	Portugal	+1.40	28%
-	**ex-GDR**	+1.22	5
-	Ireland	+1.14	13
	Spain	+1.08	18
	Greece	+1.06	13
	Belgium	+1.04	10
	Denmark	+0.99	4
	France	+0.99	6
	Netherlands	+0.99	8
	United Kingdom	+0.98	5
	EC12	**+0.96**	**9**
	Italy	+0.95	9
	Germany (Combined Scores)	+0.81	8
-	ex-FRG	+0.70	8
	Luxembourg	+0.50	10

As Table 9 shows, global support, ranging from +0.89 to +1.05, is generally very high, and once again the only negative score concerns research on farm animals (the lowest means being -0.23).

The influence of variables such as sex, age, education level, income level and religious persuasion on support for different applications of biotechnology / genetic engineering is very low (if at all significant!) and simply restates the factors described in Chapters 1 and 2 (following the same logic as Graph 5).

The effect of opinion leadership is minimal, despite what Graph 5 would lead us to believe.

Table 9 : Types of biotechnology/genetic engineering research that are "worthwhile and should be encouraged" (Breakdown of EC12 means by different socio-demographic and socio-political variables)

QUESTION : cf. table 8.

		SEX		AGE				AGE AT END OF STUDIES					TOTAL EC 12
		M	F	15-24	25-39	40-54	55+	-16	16-17	18-19	20+	still studying	
PLANTS	(*)	+1.09	+0.88	+1.08	+0.98	+0.96	+0.94	+0.86	+0.96	+1.02	+1.15	+1.09	+0.98
"A" MICRO-ORGANISMS	(*)	+1.23	+1.12	+1.19	+1.20	+1.15	+1.16	+1.10	+1.16	+1.21	+1.28	+1.23	+1.17
"B" MICRO-ORGANISMS	(*)	+1.61	+1.54	+1.60	+1.61	+1.57	+1.53	+1.48	+1.56	+1.63	+1.66	+1.64	+1.57
FARM ANIMALS	(*)	+0.02	-0.22	+0.07	-0.16	-0.16	-0.12	-0.12	-0.23	-0.12	-0.03	+0.09	-0.10
FOOD	(*)	+0.54	+0.41	+0.64	+0.44	+0.41	+0.44	+0.38	+0.46	+0.51	+0.53	+0.64	+0.47
MEDICINES/VACCINES	(*)	+1.60	+1.57	+1.62	+1.59	+1.58	+1.56	+1.56	+1.58	+1.56	+1.64	+1.62	+1.59
HUMAN BEINGS	(*)	+1.06	+1.02	+1.08	+1.07	+1.02	+1.01	+1.08	+0.98	+1.02	+1.06	+1.06	+1.04
OVERALL MEANS	(**)	+1.02	+0.90	+1.04	+0.96	+0.93	+0.93	+0.90	+0.92	+0.97	+0.96	+1.05	+0.96
MEANS OF "DK/NA" (%)	(***)	8	10	6	6	8	15	16	7	5	4	4	9

		LEFT-RIGHT SCALE (****)			OPINION LEADERSHIP (****)				LEVEL OF INCOME (*****)				RELIGIOSITY (******)		TOTAL EC 12
		L.	C.	R.	++ high	+	-	-- low	++ high	+	-	-- low	Religious	Non religious	
PLANTS	(*)	+1.02	+0.94	+1.09	+1.12	+1.01	+0.95	+0.88	+1.15	+1.02	+0.95	+0.86	+0.94	+1.06	+0.98
"A" MICRO-ORGANISMS	(*)	+1.18	+1.15	+1.26	+1.21	+1.22	+1.13	+1.13	+1.31	+1.22	+1.13	+1.07	+1.14	+1.23	+1.17
"B" MICRO-ORGANISMS	(*)	+1.59	+1.57	+1.63	+1.69	+1.62	+1.53	+1.46	+1.66	+1.60	+1.57	+1.51	+1.55	+1.62	+1.57
FARM ANIMALS	(*)	-0.15	-0.13	-0.01	-0.07	-0.12	-0.11	-0.07	-0.08	-0.11	-0.13	-0.15	-0.09	-0.14	-0.10
FOOD	(*)	+0.43	+0.40	+0.62	+0.49	+0.46	+0.50	+0.42	+0.54	+0.51	+0.43	+0.37	+0.48	+0.47	+0.47
MEDICINES/VACCINES	(*)	+1.57	+1.57	+1.64	+1.64	+1.60	+1.58	+1.53	+1.66	+1.61	+1.57	+1.52	+1.58	+1.60	+1.59
HUMAN BEINGS	(*)	+0.99	+1.01	+1.10	+0.99	+1.01	+1.05	+1.15	+1.02	+1.03	+1.06	+1.03	+1.05	+1.04	+1.04
OVERALL MEANS	(**)	+0.95	+0.93	+1.05	+1.01	+0.97	+0.95	+0.93	+1.04	+0.98	+0.94	+0.89	+0.95	+0.98	+0.96
MEANS OF "DK/NA" (%)	(***)	9	8	6	5	6	9	19	4	6	9	14	10	6	9

(*) These means are calculated by applying the coefficients +2, +1, -1 and -2 to the responses "definitely agree", "tend to agree", "tend to disagree" and "definitely disagree" respectively; the central point is therefore 0: below this point, negative responses predominate, and above, positive responses. "Don't knows" are excluded from the calculation

(**) Average of averages, i.e. the sum of averages "PLANTS", ""A" MICRO-ORGANISMS", ... and "HUMAN BEINGS", all divided by 7.

(***) Average of "DK/NA" for the items "PLANTS", ""A" MICRO-ORGANISMS", ... and "HUMAN BEINGS".

(****) See Appendix 1.

(*****) Quartiles in each country.

(******) Response to the question : "Whether you do or you don't follow religious practices, would you say that you are : a) religious ; b) not religious; c) an agnostic ; d) an atheist ; e) don't know.
In this table, the "religious" category includes responses a) and the "non-religious" category, responses b), c) and d).

The influence of political persuasion (also very limited) does lead us to conclude that individuals falling to the right of the political spectrum tend to express more support for biotechnology / genetic engineering (regardless of the application) than those on the left.

Given the relative lack of support (with an EC12 average of -0.10 it is hard to speak in terms of a "rejection"!) for research on farm animals, it is interesting to look a little more deeply at attitudes towards another application involving animals in biotechnology/ genetic engineering research - that regarding the development of "life-saving" drugs or the investigation of human diseases.

Table 10 shows that:

the Community level of "don't knows" is fairly low, especially when compared with those in Chapters 1 and 2. Nonetheless, and in agreement with preceding results, this masks a very strong disparity between results on a country by country basis;

regardless of the country under analysis, with the exception of Italy, experimentation on animals is perceived by the majority to be acceptable "for the development of life-saving drugs, even at the cost of some animal suffering", or, to a lesser extent, "provided that the animals' welfare is safeguarded" (EC12 average: 44%[2]). Even if this opinion is shared by less than 40% of people in France, Luxembourg or (above all) Italy (33%!), it is however supported by 53% of East Germans and Spaniards, 55% of Belgians and 65% of Greeks;

[2] We should note, however, that this score is higher: 1) among men than women (46% versus 41%), and; 2) among individuals falling to the right of the political spectrum than among those on the political left (49% versus 41%). We should also point out that, much as we might expect, the 44% of Europeans that are of this opinion tend to be those that support research on farm animals, even if this level of support (on average + 0.28) is strongly relative.

Table 10 : Opinion with regard to the application of biotechnology/genetic engineering to animals (EC 12 Percentages)

QUESTION : Scientists can also apply biotechnology/genetic engineering to animals to develop life-saving drugs, or to study human diseases. Animal protection is guaranteed by law and some people say it is morally wrong to apply biotechnology/genetic engineering to animals. Which of the following is closest to your personal opinion ?

ITEM(1: Applying biotechnology/genetic engineering to animals is morally acceptable, provided that the animals' welfare is safeguarded.

ITEM 2: It is acceptable for the development of life saving drugs, even at the cost of some animal suffering.

ITEM 3: Public authorities should examine this application of biotechnology/genetic engineering case by case before deciding whether to allow it.

ITEM 4: Applying biotechnology/genetic engineering to animals is morally unacceptable and should be banned by public law.

	B	DK	D-WEST	D-OST	D-GESAMT	GR	E	EC 12
ITEM 1	39	35	29	41	32	45	39	31
ITEM 2	16	12	12	12	12	20	14	13
ITEM 3	20	34	27	30	28	12	19	28
ITEM 4	21	16	25	13	22	12	13	20
DK/NA	5	4	6	5	6	12	14	9
TOTAL	101	101	99	101	100	101	99	101
	F	IRL	i	L	NL	P	UK	EC 12
ITEM 1	32	35	16	25	31	41	33	31
ITEM 2	7	11	17	12	11	6	12	13
ITEM 3	25	23	40	25	34	15	27	28
ITEM 4	26	18	19	28	17	8	22	20
DK/NA	9	14	8	11	7	30	6	9
TOTAL	99	101	100	101	100	100	100	101

the idea that "public authorities should examine this application of biotechnology / genetic engineering case by case before deciding whether to allow it", supported by 28%[3] at Community level, is shared by 40% of Italians, and by 38% of the Dutch and Danes, but only by 12% of Greeks and 15% or Portuguese;

finally, in the opinion of one fifth of Europeans interviewed, "applying biotechnology/ genetic engineering to animals is morally unacceptable and -should be banned by law"[4]. This proportion varies from 8% in Portugal to 28% in Luxembourg.

[3] These 28% of Europeans tend to denounce research on farm animals (a mean of-0.19).

[4] **This 20% also reject research on farm animals (a mean of -0.90).**

Tables 11a and 11b : Types of biotechnology/genetic engineering research that "may involve risks to human health or to the environment"

QUESTIONS : I would like to ask your opinion about some examples of biotechnology/genetic engineering research :

1) Let us start with an example concerning plants.
Scientists are trying to use biotechnology/genetic engineering to change plants, in ways that may be quicker or more precise than traditional breeding programms, in order to make the plants more useful.
For example, make them resistant to diseases or pests, make them ripen faster or give them the ability to grow in dry or salty soils.
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement : such research on plants may involve risks to human health or to the environment. **(PLANTS)**

2) Here is an example concerning micro-organisms, such as the yeast we use to make bread, or beer, or yoghurt ; or the micro-fungi we use to make medicines such as penicillin.
Scientists know how to change these micro-organisms through biotechnology/genetic engineering, in order to improve their performance - that means, getting them to work faster or even to produce new products.
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement : such research on these micro-organisms may involve risks to human health or to the environment. **("A" MICRO-ORGANISMS)**

3) Some of these micro-organisms are used to break down sewage and other waste products and to turn them into materials harmless to the soil.
Here again, scientists are trying, through biotechnology/genetic engineering, to improve these micro-organisms.
They are trying to make them work faster or to make them clean up oil-slicks or other contaminants in the environment.
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement : such research on these micro-organisms may involve risks to human health or to the environment. **("B" MICRO-ORGANISMS)**

4) Another development is the application of biotechnology/genetic engineering to farm animals, to change them in quicker or more precise ways than traditional breeding programs, in order to make them more useful: for example, make them resistant to diseases, or grow faster, or produce more or better quality meat or milk.
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement : such research on farm animals may involve risks to human health or to the environment. **(FARM ANIMALS)**

5) These news methods of biotechnology/genetic engineering are also being applied to the production and processing of foods. Scientists say that they can improve the quality of food and drink - for example, by making it higher in protein, or lower in fat, or making it keep longer, or taste better.
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement : such research on food may involve risks to human health or to the environment. **(FOOD)**

6) Yet another application of biotechnology/genetic engineering is the development of new medicines and vaccines to improve human health, for example the production of human insulin for the treatment of diabetics.
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement : such research on medicines and vaccines may involve risks to human health or to the environment. **(MEDICINES/VACCINES)**

7) Science is also trying to apply some of the new methods of biotechnology/genetic engineering to human beings, or to their cells and their tissues, for various purposes such as detecting, or curing diseases, and characteristics we might have inherited from our parents.
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement : such research on human beings may involve risks to human health or to the environment. **(HUMAN BEINGS)**

Table 11a : Percentages and means for EC12

	Agree ++	Agree +	Disagree -	Disagree --	DK/NA	TOTAL	Means (*)
PLANTS	23	34	20	8	16	101	+0.50
"A" MICRO-ORGANISMS	20	34	21	8	18	101	+0.45
"B" MICRO-ORGANISMS	19	30	22	12	17	100	+0.24
FARM ANIMALS	35	33	13	6	14	101	+0.91
FOOD	27	35	17	7	15	101	+0.67
MEDICINES/VACCINES	19	29	23	13	16	100	+0.21
HUMAN BEINGS	26	32	17	8	17	100	+0.61

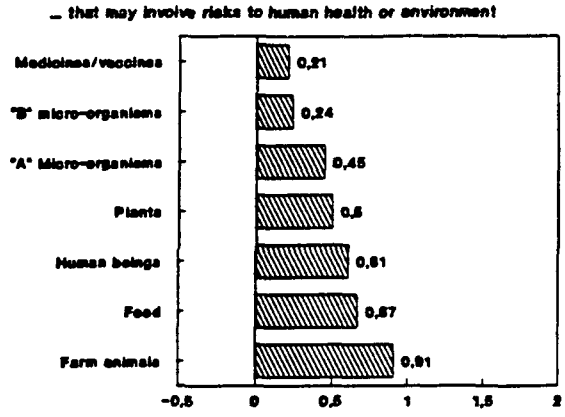
Table 11b : National breakdown of "don't knows" (%) and means

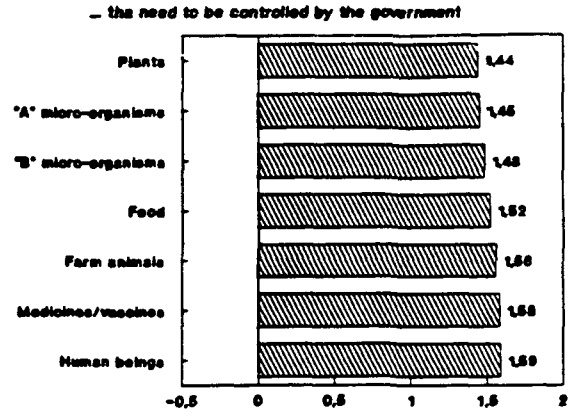
1st column : Means (*) 2nd column : % of DK/NA	B		DK		D-WEST		D-OST		D-GESAMT		GR		E		EC12	
	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?
PLANTS	+0.41	17	+1.00	7	+0.67	12	+0.51	9	+0.64	11	+0.81	23	+0.27	31	+0.50	16
"A" MICRO-ORGANISMS	+0.42	21	+1.05	10	+0.70	13	+0.56	11	+0.67	13	+0.58	28	+0.33	33	+0.45	18
"B" MICRO-ORGANISMS	+0.33	18	+0.82	9	+0.51	13	+0.33	10	+0.47	12	-0.04	28	+0.12	33	+0.24	17
FARM ANIMALS	+0.84	15	+1.11	8	+1.18	11	+0.87	8	+1.11	10	+0.95	22	+0.74	27	+0.91	14
FOOD	+0.56	17	+1.03	8	+0.91	12	+0.73	8	+0.87	11	+0.69	24	+0.56	30	+0.67	15
MEDICINES/VACCINES	+0.32	19	+0.85	7	+0.65	13	+0.38	7	+0.59	12	-0.16	25	-0.10	28	+0.21	16
HUMAN BEINGS	+0.67	17	+1.21	8	+1.01	12	+0.72	10	+0.95	12	+0.23	25	+0.36	31	+0.61	17

1st column : Means (*) 2nd column : % of DK/NA	F		IRL		I		L		NL		P		UK		EC12	
	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?
PLANTS	+0.69	10	+0.50	20	+0.44	17	+0.38	16	+0.42	14	+0.34	41	+0.26	10	+0.50	16
"A" MICRO-ORGANISMS	+0.51	14	+0.51	21	+0.21	19	+0.41	17	+0.60	14	+0.40	44	+0.28	10	+0.45	18
"B" MICRO-ORGANISMS	+0.34	13	+0.30	20	-0.10	19	+0.36	15	+0.38	16	-0.19	38	+0.18	11	+0.24	17
FARM ANIMALS	+1.09	7	+0.86	18	+0.71	16	+0.69	15	+1.05	12	+0.75	37	+0.69	8	+0.91	14
FOOD	+0.74	8	+0.58	19	+0.52	17	+0.58	12	+0.62	15	+0.47	41	+0.52	9	+0.67	15
MEDICINES/VACCINES	+0.18	14	+0.23	18	-0.29	19	+0.35	15	+0.44	14	-0.16	41	+0.29	10	+0.21	16
HUMAN BEINGS	+0.56	13	+0.54	19	+0.25	21	+0.61	16	+0.78	15	+0.22	45	+0.59	9	+0.61	17

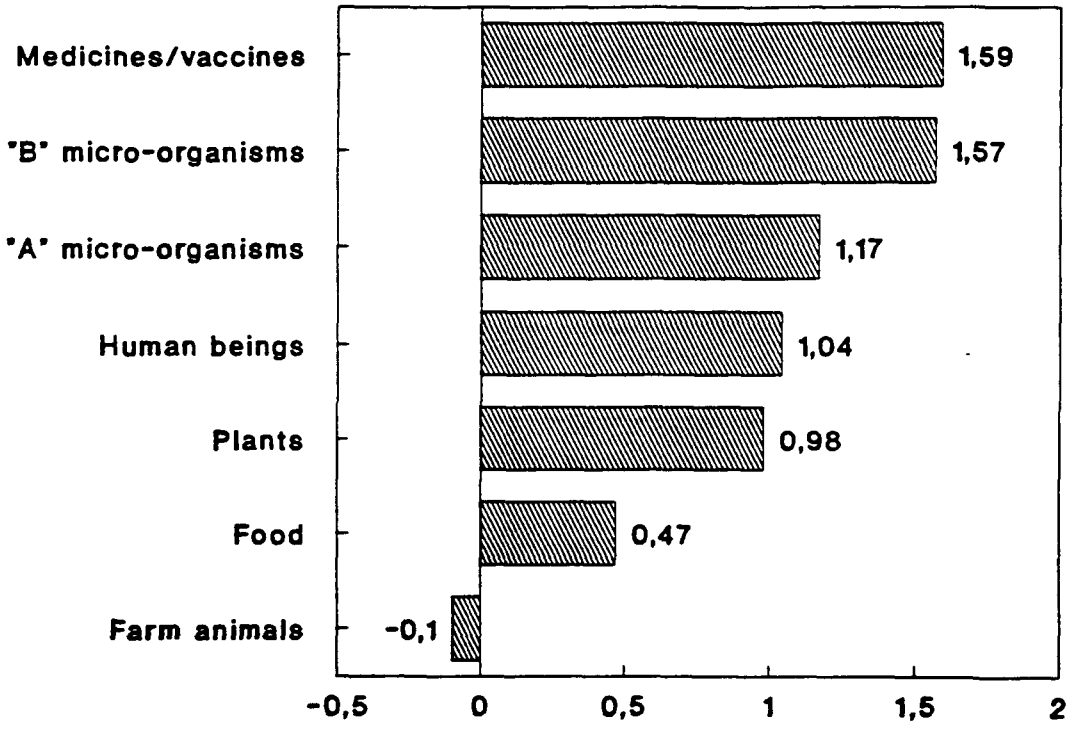
(*) These means are calculated by applying the coefficients +2, +1, -1 and -2 to the responses "definitely agree", "tend to agree", "tend to disagree" and "definitely disagree" respectively; the central point is therefore 0 : below this point, negative responses predominate, and above, positive responses. "Don't knows" are excluded from the calculation.

Graph 6 : Types of biotechnology/genetic engineering research (EC12 means (*)) ...





... that are worthwhile and should be encouraged



(*) Means vary from -2 (definitely disagree) and +2 (defin. agree); Method of calculation: cf. tables 8,9, 11-14

3.2 Risks to Human Health and to the Environment associated with Different Applications

At Community level, the principal observations that can be made on Tables 11a and lib and on Graphs 6 and 7 are:

the risk associated with different applications of biotechnology / genetic engineering varies from +0.21 to +0.91, in other words within a fairly small range. Even if this is not negligible, the "global risk" of biotechnology/ genetic engineering perceived by Europeans (which can range from -2 to +2) is just +0.51, or not very high;

the percentage of "don't knows" oscillates between 14% and 18% (a mean of 16%), that is at a high level, making it difficult to assess this risk;

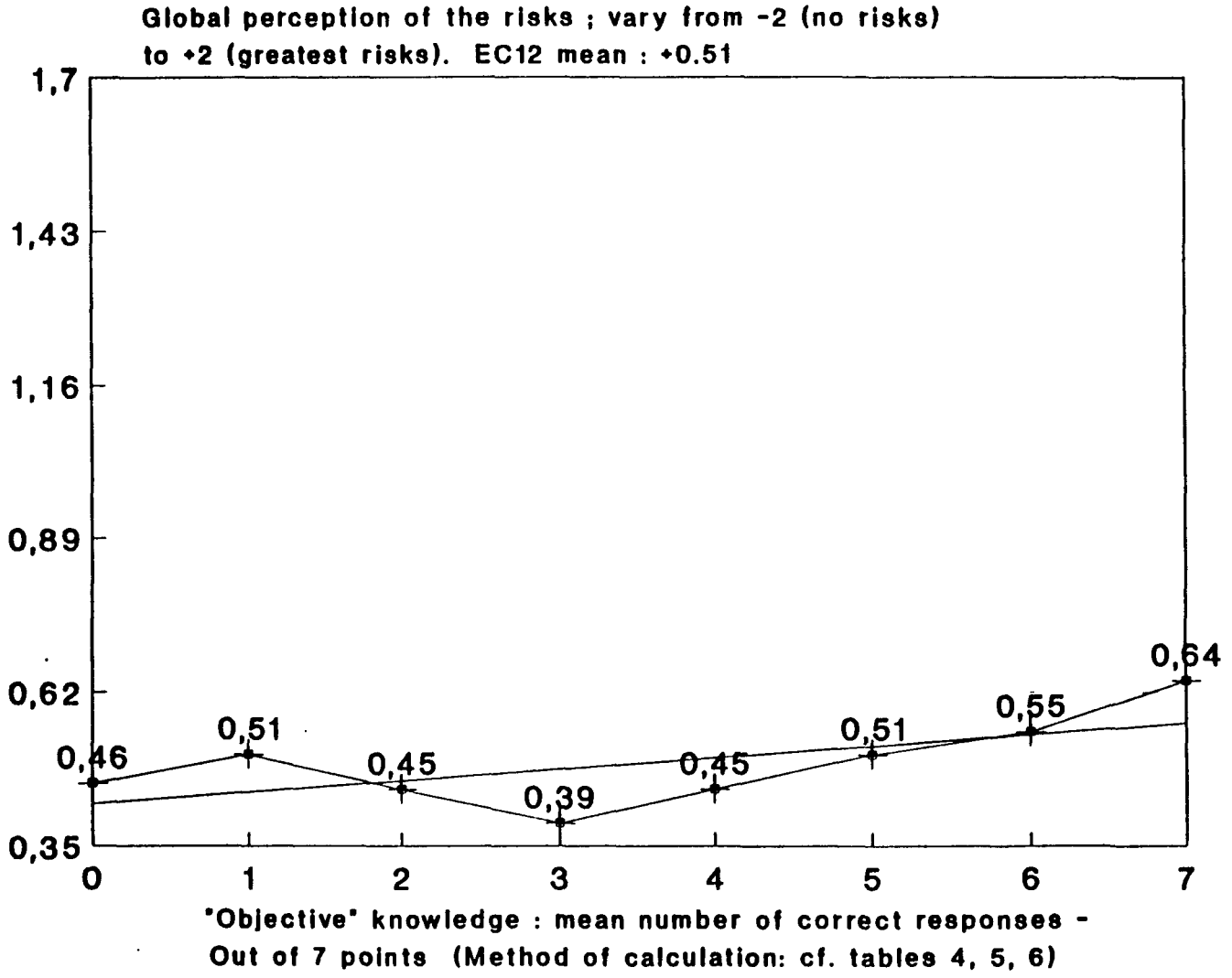
if we rank these seven types of research by increasing order of perceived risk, we obtain virtually the same order as if they were ranked by decreasing order of support (the only inversion being between plant and human research). At first sight this seems to be quite coherent (cf. Graph 6)[5]. This explains the fact that:

* research on farm animals is perceived to be the most risky (+0.91);

* research on "B" micro-organisms (+0.24) and research into medicines/ vaccines (+0.21) is perceived to be the least risky;

[5] "We should point out that the inversion in support between plant and human research is itself relative, given that the support expressed for biotechnology and genetic engineering research on human beings and on plants is virtually identical.

Graph 7 : "Objective" knowledge of biotechnology/genetic engineering and global perception of the risks these applications imply - What relationship ? (EC12)



as Graph 7 shows, global perception of the risk inherent in the different applications of biotechnology / genetic engineering is only very slightly influenced (upwards) by the "objective" level of understanding of biotechnology / genetic engineering (as defined in Chapter 2).

At national level, the results of Table lib can be summarised as:

with just two-exceptions (Denmark and the United Kingdom), research on farm animals is considered to be the most risky everywhere in the Community, whereas research into "B" micro-organisms and into medicines / vaccines (and, in some cases, research on plants) are perceived in general to be less risky. In Denmark, where we see the highest mean scores for six of the seven biotechnology / genetic engineering applications analysed[6], research on human beings is considered to be the most risky (+1.21), followed very closely nonetheless by research on farm animals (+1.11). In the United Kingdom, the risks of research into medicines / vaccines is considered to be much the same (+0.29) as that inherent in plant research (+0.26) and "A" micro-organisms (+0.28);

once again, national means vary strongly from country to country. This is particularly striking in the case of research into "B" micro-organisms and for research into medicines / vaccines, which vary from -0.19 (in Portugal) to +0.82 (in Denmark) and from -0.29 (in Italy) to +0.85 (in Denmark) respectively. We should also note that the few negative national means in the table all relate to one or other of these two applications, which in the light of the previous discussion is hardly surprising;

6 In the seventh case (research on farm animals) the Danish score is still the second highest.

Table 12 : Types of biotechnology/genetic engineering research that "may involve risks to human health or to the environment" (breakdown of EC12 means by different socio-demographic and socio-political variables)

QUESTION : cf. table 11.

		SEX		AGE				AGE AT END OF STUDIES					TOTAL EC 12
		M	F	15-24	25-39	40-54	55+	-16	16-17	18-19	20+	still studying	
PLANTS	(*)	+0.42	+0.58	+0.34	+0.51	+0.58	+0.55	+0.54	+0.48	+0.51	+0.52	+0.36	+0.50
"A" MICRO-ORGANISMS	(*)	+0.41	+0.49	+0.34	+0.49	+0.45	+0.51	+0.47	+0.45	+0.45	+0.50	+0.31	+0.45
"B" MICRO-ORGANISMS	(*)	+0.18	+0.30	+0.13	+0.29	+0.25	+0.27	+0.27	+0.24	+0.23	+0.28	+0.12	+0.24
FARM ANIMALS	(*)	+0.86	+0.96	+0.72	+0.93	+0.95	+0.99	+0.90	+0.89	+1.01	+0.96	+0.72	+0.91
FOOD	(*)	+0.63	+0.70	+0.49	+0.71	+0.74	+0.69	+0.66	+0.65	+0.72	+0.74	+0.50	+0.67
MEDICINES/VACCINES	(*)	+0.18	+0.24	+0.08	+0.27	+0.21	+0.26	+0.21	+0.27	+0.17	+0.27	+0.07	+0.21
HUMAN BEINGS	(*)	+0.60	+0.61	+0.49	+0.65	+0.60	+0.66	+0.54	+0.62	+0.62	+0.76	+0.49	+0.61
OVERALL MEANS	(**)	+0.47	+0.55	+0.37	+0.55	+0.54	+0.56	+0.51	+0.51	+0.53	+0.57	+0.37	+0.51
MEANS OF "DK/NA" (%)	(***)	14	18	12	12	15	23	25	12	12	10	10	16

		LEFT-RIGHT SCALE (****)			OPINION LEADERSHIP (****)				LEVEL OF INCOME (*****)				RELIGIOSITY (******)		TOTAL EC 12
		L.	C.	R.	++ high	+	-	-- low	++ high	+	-	-- low	Reli-gious	Non re-ligious	
PLANTS	(*)	+0.55	+0.51	+0.41	+0.56	+0.50	+0.51	+0.43	+0.44	+0.51	+0.47	+0.58	+0.52	+0.45	+0.50
"A" MICRO-ORGANISMS	(*)	+0.50	+0.45	+0.40	+0.55	+0.43	+0.47	+0.40	+0.47	+0.44	+0.44	+0.48	+0.45	+0.45	+0.45
"B" MICRO-ORGANISMS	(*)	+0.26	+0.31	+0.17	+0.29	+0.23	+0.25	+0.21	+0.28	+0.22	+0.22	+0.24	+0.23	+0.23	+0.24
FARM ANIMALS	(*)	+0.99	+0.89	+0.86	+0.99	+0.91	+0.94	+0.75	+1.01	+0.94	+0.86	+0.93	+0.94	+0.86	+0.91
FOOD	(*)	+0.72	+0.71	+0.57	+0.78	+0.66	+0.66	+0.60	+0.69	+0.68	+0.62	+0.74	+0.68	+0.64	+0.67
MEDICINES/VACCINES	(*)	+0.25	+0.27	+0.20	+0.33	+0.17	+0.24	+0.15	+0.29	+0.24	+0.13	+0.27	+0.18	+0.26	+0.21
HUMAN BEINGS	(*)	+0.61	+0.66	+0.58	+0.72	+0.62	+0.60	+0.48	+0.69	+0.66	+0.54	+0.57	+0.57	+0.65	+0.61
OVERALL MEANS	(**)	+0.55	+0.54	+0.45	+0.60	+0.50	+0.52	+0.43	+0.55	+0.53	+0.47	+0.54	+0.51	+0.50	+0.51
MEANS OF "DK/NA" (%)	(***)	15	14	12	10	12	16	27	8	13	16	22	18	11	16

(*) These means are calculated by applying the coefficients +2, +1, -1 and -2 to the responses "definitely agree", "tend to agree", "tend to disagree" and "definitely disagree" respectively; the central point is therefore 0: below this point, negative responses predominate, and above, positive responses. "Don't knows" are excluded from the calculation

(**) Average of averages, i.e. the sum of averages "PLANTS", ""A" MICRO-ORGANISMS", ... and "HUMAN BEINGS", all divided by 7.

(***) Average of "DK/NA" for the items "PLANTS", ""A" MICRO-ORGANISMS", ... and "HUMAN BEINGS".

(****) See Appendix 1.

(*****) Quartiles in each country.

(******) Response to the question : "Whether you do or you don't follow religious practices, would you say that you are : a) religious ; b) not religious; c) an agnostic ; d) an atheist ; e) don't know.
In this table, the "religious" category includes responses a) and the "non-religious" category, responses b), c) and d).

global perception of the risk of these different applications of biotechnology / genetic engineering (which can range from -2 to +2), and the average percentage of "don't knows", depends to a large extent on the country under consideration:

	Country	Risk	DK/NA
-	Denmark	+1.01	8%
-	ex-FRG	+0.80	12
	Germany (combined scores)	+0.76	12
-	Netherlands	+0.61	14
	ex-GDR	+0.59	9
	France	+0.59	11
	Belgium	+0.51	18
	EC12	+0.51	16
	Ireland	+0.50	19
	Luxembourg	+0.48	15
	Greece	+0.44	25
-	United Kingdom	+0.40	10
-	Spain	+0.33	30
	Portugal	+0.26	41
	Italy	+0.25	18

If we compare this ranking with that for global support for different biotechnology/ genetic engineering applications (cf. supra), we see that even if Denmark is by far the country having the strongest perception of risk (twice the Community average), its global support at +0.99 is higher, if not significantly so, than the average for the Twelve (+0.96).

On the whole the effect of socio-demographic and socio-political variables on the perception of the risk of different applications of biotechnolpgy / genetic engineering is weak, relatively diffuse and, with the exception of opinion leadership, runs along similar lines to that in the earlier analysis (cf. Table 12):

regardless of the sector of application, where there is a difference in perception at all, men are less conscious of risk than women;

again regardless of the sector of application, 15-24 year olds have the lowest perception of risk. Among 25-39 year olds, 40-54 year olds and 55s and over, perception of risk is on average the same (statistically speaking);

with the exception of research on human beings (for which we note an increasing trend), perception of risk does not change significantly with education level. The low score recorded among students (of all ages) is due more to their age than anything else, most students falling into the 15-24 year age group;

regardless of the application under consideration, people falling to the right of the political spectrum perceive the risk to be lower (if there is a significant difference at all) than do those falling to the political left;

again regardless of the application under consideration, and contrary to expectations, people classified as "opinion leaders" (as defined in Appendix 1) perceive the risk to be *higher* than others;

income level has no coherent influence on the perception of risk (i.e. there is no significant trend);

on the whole, religious persuasion has no effect on the perception of risk.

The number of "don't knows" broadly follows the logic expounded before.

Tables 13a et 13b : Types of biotechnology/genetic engineering research that "need to be controlled by the government"

QUESTIONS : I would like to ask your opinion about come examples of biotechnology/genetic engineering research :

1) Let us start with an example concerning plants.
Scientists are trying to use biotechnology/genetic engineering to change plants, in Mays that may be quicker or -ore precise than traditional breeding programs, in order to Bake the plants lore useful.
For example, make them resistant to diseases or pests. Make them ripen faster or give them the ability to grow in dry or salty soils.
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement : such research on plants needs to be controlled by the government. (PLANTS)

2) Here is an example concerning micro-organisms, such as the yeast we use to make bread, or beer, or yoghurt ; or the micro-fungi we use to lake medicines such as penicillin.
Scientists know how to change these micro-organisms through biotechnology/genetic engineering, in order to improve their performance • that means, getting them to work faster or even to produce new products.
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement : such research on these micro-organisms needs to be controlled by the government. ("A" MICRO-ORGANISMS)

3) Some of these micro-organisms are used to break down sewage and other waste products and to turn them into materials harmless to the soil.
Here again, scientists are trying, through biotechnology/genetic engineering, to improve these micro-organisms.
They are trying to lake them work faster or to make them clean up oil-slicks or other contaminants in the environment.
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement : such research on these micro-organisms needs to be controlled by the government. ("B" MICRO-ORGANISMS)

4) Another development is the application of biotechnology/genetic engineering to farm animals, to change them in quicker or more precise ways than traditional breeding programs, in order to make them more useful: for example, make them resistant to diseases, or grow faster, or produce more or better quality meat or milk.
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement : such research on farm animals needs to be controlled by the government. (FARM ANIMALS)

5) These news methods of biotechnology/genetic engineering are also being applied to the production and processing of foods. Scientists say that they can improve the quality of food and drink -.for example, by making it higher in protein, or lower in fat, or —king it keep longer, or taste better.
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement : such research on food needs to be controlled by the government. (FOOD)

6) Yet another application of biotechnology/genetic engineering is the development of new medicines and vaccines to improve human health, for example the production of human insulin for the treatment of diabetics.
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement : such research on Medicines and vaccines needs to be controlled by the government. (MEDICINES/VACCINES)

7} Science is also trying to apply some of the new methods of biotechnology/genetic engineering to human beings, or to their cells and their tissues, for various purposes such as detecting, or curing diseases, and characteristics we Right have inherited from our parents.
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement : such research on human beings needs to be controlled by the government. (HUMAN BEINGS)

Table 13a : Percentages and means for EC12

	Agree ++	Agree +	Disagree -	Disagree --	DK/NA	TOTAL	Means (*)
PLANTS	60	22	5	3	9	99	+1.44
"A" MICRO-ORGANISMS	61	22	5	3	9	100	+1.45
"B" MICRO-ORGANISMS	62	22	5	3	8	100	+1.48
FARM ANIMALS	68	17	4	3	8	100	+1.56
FOOD	64	20	4	3	9	100	+1.52
MEDICINES/VACCINES	68	19	3	2	8	100	+1.58
HUMAN BEINGS	68	17	4	3	9	101	+1.59

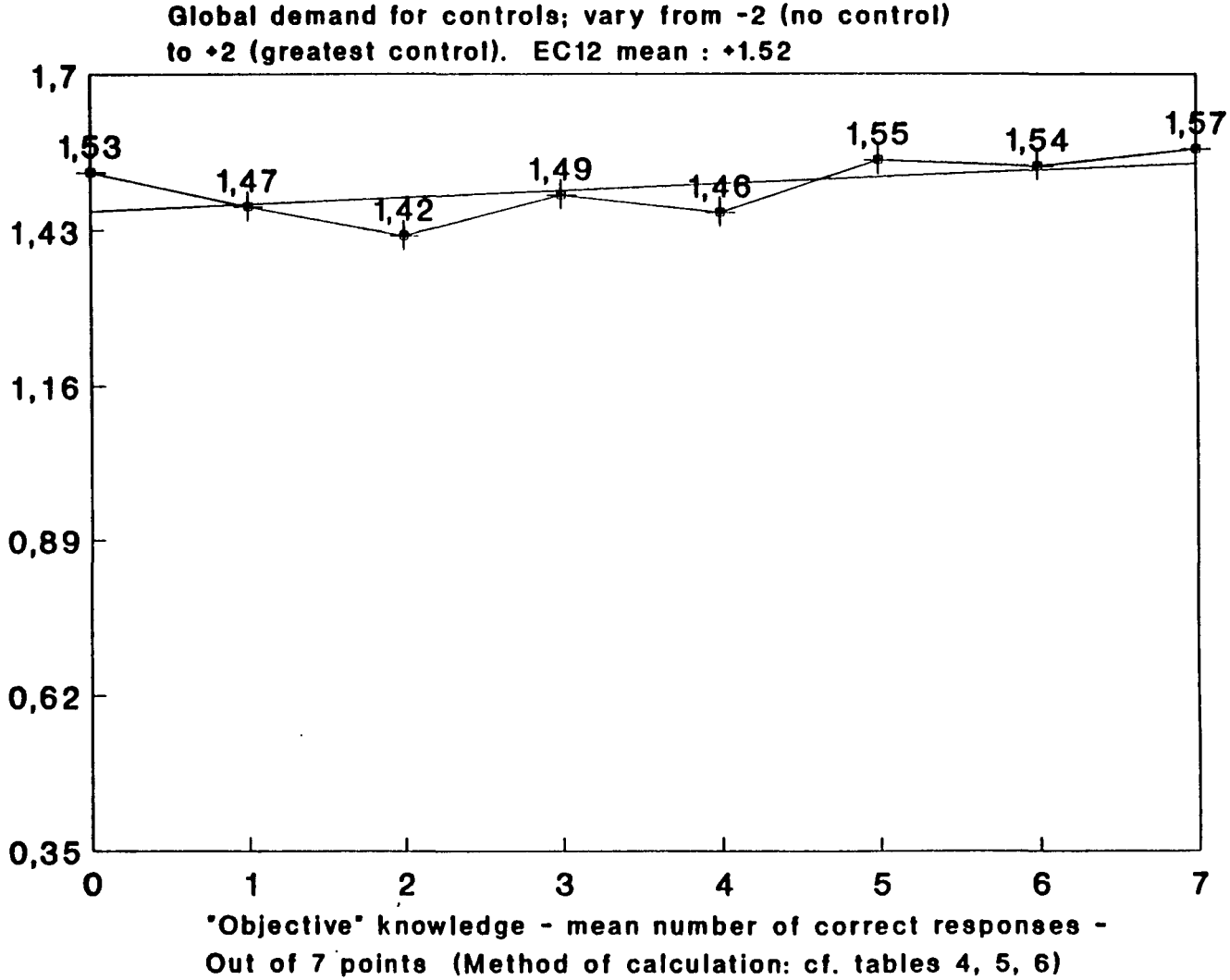
Table 13b : National breakdown of "don't knows" (%) and means

1st column : Means (*) 2nd column : % of DK/NA	B		DK		D-WEST		D-OST		D-GESAMT		GR		E		EC12	
	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?
PLANTS	+1.35	11	+1.66	3	+1.58	6	+1.73	3	+1.61	6	+1.49	13	+1.33	19	+1.44	9
"A" MICRO-ORGANISMS	+1.34	12	+1.69	5	+1.60	6	+1.71	5	+1.62	6	+1.49	15	+1.39	19	+1.45	9
"B" MICRO-ORGANISMS	+1.44	11	+1.69	3	+1.57	5	+1.71	4	+1.60	5	+1.59	13	+1.41	20	+1.48	8
FARM ANIMALS	+1.39	10	+1.72	3	+1.72	5	+1.75	3	+1.73	5	+1.52	12	+1.48	16	+1.56	8
FOOD	+1.44	10	+1.70	3	+1.60	6	+1.72	3	+1.63	6	+1.52	13	+1.44	17	+1.52	9
MEDICINES/VACCINES	+1.56	9	+1.74	2	+1.70	6	+1.79	3	+1.72	5	+1.56	11	+1.51	14	+1.58	8
HUMAN BEINGS	+1.55	10	+1.75	3	+1.73	7	+1.80	4	+1.75	6	+1.54	11	+1.51	17	+1.59	9

1st column : Means (*) 2nd column : % of DK/NA	F		IRL		I		L		NL		P		UK		EC12	
	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?
PLANTS	+1.33	6	+1.41	12	+1.41	10	+1.31	9	+1.71	7	+1.44	33	+1.31	5	+1.44	9
"A" MICRO-ORGANISMS	+1.35	7	+1.45	12	+1.38	9	+1.32	8	+1.72	8	+1.49	35	+1.34	5	+1.45	9
"B" MICRO-ORGANISMS	+1.42	5	+1.43	12	+1.43	8	+1.41	8	+1.71	7	+1.56	33	+1.35	5	+1.48	8
FARM ANIMALS	+1.50	5	+1.52	12	+1.43	8	+1.37	9	+1.77	7	+1.55	32	+1.52	5	+1.56	8
FOOD	+1.40	7	+1.48	11	+1.53	9	+1.19	7	+1.75	6	+1.52	34	+1.46	5	+1.52	9
MEDICINES/VACCINES	+1.49	5	+1.46	10	+1.55	8	+1.44	8	+1.77	6	+1.53	32	+1.50	5	+1.58	8
HUMAN BEINGS	+1.47	7	+1.53	12	+1.53	9	+1.31	9	+1.77	7	+1.51	36	+1.55	5	+1.59	9

(*) These means are calculated by applying the coefficients +2, +1, -1 and -2 to the responses "definitely agree", "tend to agree", "tend to disagree" and "definitely disagree" respectively ; the central point is therefore 0 : below this point, negative responses predominate, and above,positive responses. "Don't knows" are excluded from the calculation.

Graph 8 : "Objective" knowledge of biotechnology/genetic engineering and global demand for controls on their applications - What relationship ? (EC12)



3.3 Demand for Government Control of these Different Applications

The data in Tables 13a, 13b and 14, together with Graphs 6 and 8, can be summarised fairly simply:

regardless of the country or of the application of biotechnology / genetic engineering, the requirement for government control (an index that can range from -2 to +2) is extremely strong and homogeneous. It ranges between very high and narrow limits:

* lower limit: +1.31; this is seen in Luxembourg, the United Kingdom and generally in connection with plant research;

* upper limit: +1.80; this is seen in the ex-Democratic Republic of Germany, and for research on human beings;

contrary to the mean percentage of "don't knows", the requirement for government control, or in other words the mean of the indices for each of the seven application areas under consideration, varies little from country to country, and ranges from +1.34 to +1.74:

Country	Control	DK/NA
ex-GDR	+1.74	4%
Netherlands	+1.74	7
Denmark	+1.70	3
Germany (combined scores)	+1.67	6
- ex-FRG	+1.64	6
Greece	+1.53	13
ECU	+1.52	9
Portugal	+151	34
Ireland	+1.47	12
Italy	+1.47	9
Belgium	+1.44	10
Spain	+1.44	17
United Kingdom	+1.43	5
France	+1.42	6
Luxembourg	+1.34	8

Table 14 : Types of biotechnology/genetic engineering research that "needs to be controlled by the government" (breakdown of EC12 means by different socio-demographic and socio-political variables)

QUESTION : cf. table 13.

		SEX		AGE				AGE AT END OF STUDIES					TOTAL EC 12
		M	F	15-24	25-39	40-54	55+	-16	16-17	18-19	20+	still studying	
PLANTS	(*)	+1.42	+1.45	+1.19	+1.46	+1.51	+1.53	+1.52	+1.45	+1.44	+1.43	+1.14	+1.44
"A" MICRO-ORGANISMS	(*)	+1.44	+1.46	+1.23	+1.46	+1.51	+1.56	+1.55	+1.48	+1.44	+1.42	+1.15	+1.45
"B" MICRO-ORGANISMS	(*)	+1.45	+1.50	+1.31	+1.46	+1.53	+1.56	+1.55	+1.46	+1.51	+1.44	+1.26	+1.48
FARM ANIMALS	(*)	+1.55	+1.57	+1.36	+1.57	+1.61	+1.65	+1.62	+1.58	+1.57	+1.55	+1.36	+1.56
FOOD	(*)	+1.51	+1.53	+1.32	+1.53	+1.57	+1.61	+1.59	+1.54	+1.52	+1.52	+1.27	+1.52
MEDICINES/VACCINES	(*)	+1.56	+1.60	+1.46	+1.58	+1.62	+1.64	+1.63	+1.60	+1.59	+1.55	+1.42	+1.58
HUMAN BEINGS	(*)	+1.57	+1.61	+1.45	+1.58	+1.63	+1.66	+1.65	+1.58	+1.59	+1.58	+1.42	+1.59
OVERALL MEANS	(**)	+1.50	+1.53	+1.33	+1.52	+1.57	+1.60	+1.59	+1.53	+1.52	+1.50	+1.29	+1.52
MEANS OF DK/NA" (%)	(***)	7	10	7	5	7	14	15	6	5	3	6	9

		LEFT-RIGHT SCALE (****)			OPINION LEADERSHIP (****)				LEVEL OF INCOME (*****)				RELIGIOSITY (******)		TOTAL EC 12
		L.	C.	R.	++ high	+	-	-- low	++ high	+	-	-- low	Religious	Non religious	
PLANTS	(*)	+1.49	+1.43	+1.42	+1.52	+1.41	+1.47	+1.35	+1.44	+1.44	+1.47	+1.49	+1.46	+1.40	+1.44
"A" MICRO-ORGANISMS	(*)	+1.49	+1.47	+1.43	+1.54	+1.43	+1.47	+1.40	+1.46	+1.43	+1.51	+1.47	+1.47	+1.42	+1.45
"B" MICRO-ORGANISMS	(*)	+1.52	+1.48	+1.44	+1.54	+1.46	+1.50	+1.44	+1.48	+1.46	+1.51	+1.49	+1.50	+1.43	+1.48
FARM ANIMALS	(*)	+1.60	+1.56	+1.57	+1.63	+1.56	+1.56	+1.50	+1.58	+1.57	+1.57	+1.60	+1.58	+1.54	+1.56
FOOD	(*)	+1.57	+1.53	+1.49	+1.59	+1.51	+1.56	+1.40	+1.51	+1.52	+1.51	+1.57	+1.54	+1.50	+1.52
MEDICINES/VACCINES	(*)	+1.63	+1.59	+1.56	+1.63	+1.57	+1.61	+1.51	+1.57	+1.59	+1.58	+1.60	+1.59	+1.57	+1.58
HUMAN BEINGS	(*)	+1.65	+1.60	+1.55	+1.65	+1.58	+1.60	+1.51	+1.62	+1.60	+1.58	+1.62	+1.60	+1.57	+1.59
OVERALL MEANS	(**)	+1.56	+1.52	+1.49	+1.58	+1.50	+1.54	+1.44	+1.52	+1.51	+1.53	+1.55	+1.53	+1.49	+1.52
MEANS OF "DK/NA" (%)	(***)	7	7	6	3	5	9	18	3	6	7	14	10	5	9

(*) These means are calculated by applying the coefficients +2, +1, -1 and -2 to the responses "definitely agree", "tend to agree", "tend to disagree" and "definitely disagree" respectively; the central point is therefore 0: below this point, negative responses predominate, and above, positive responses. "Don't knows" are excluded from the calculation

(**) Average of averages, i.e. the sum of averages "PLANTS", ""A" MICRO-ORGANISMS", ... and "HUMAN BEINGS", all divided by 7.

(***) Average of "DK/NA" for the items "PLANTS", ""A" MICRO-ORGANISMS", ... and "HUMAN BEINGS".

(****) See Appendix 1.

(*****) Quartiles in each country.

(******) Response to the question : "Whether you do or you don't follow religious practices, would you say that you are : a) religious ; b) not religious; c) an agnostic ; d) an atheist ; e) don't know.
In this table, the "religious" category includes responses a) and the "non-religious" category, responses b), c) and d).

from this ranking we see that in the ex-Democratic Republic of Germany, where global support for biotechnology / genetic engineering is massive (the second highest after Portugal, cf. supra), this support is not blind, the need for control being also expressed strongly;

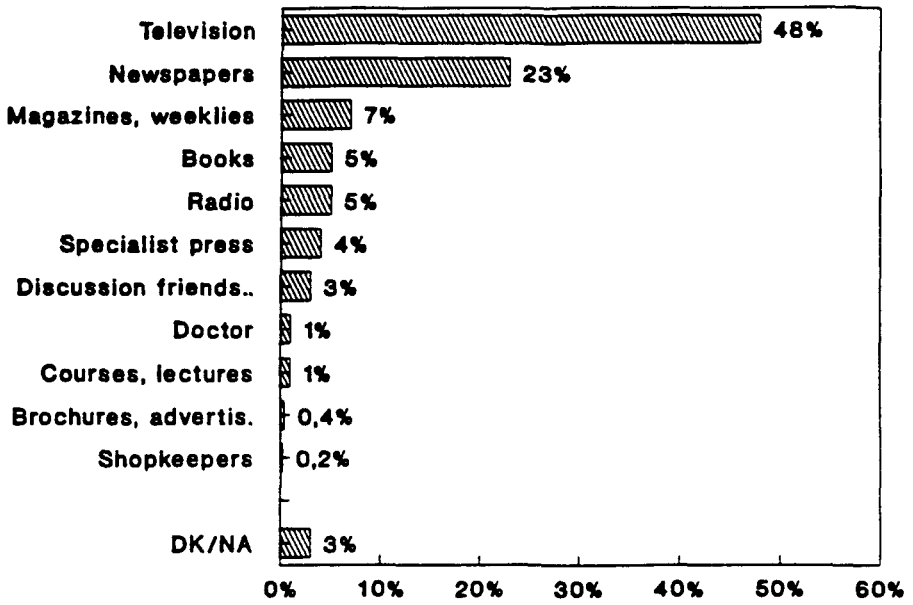
as Graph 8 shows, the global demand for control is high, independently of the level of "objective" knowledge of biotechnology / genetic engineering of the respondent (as defined in Chapter 2). This "knowledge" has hardly any influence on this demand;

the effect of socio-demographic and socio-political variables on the demand for government control of biotechnology / genetic engineering, generally weak and relatively diffuse, is the same as described for Table 12.

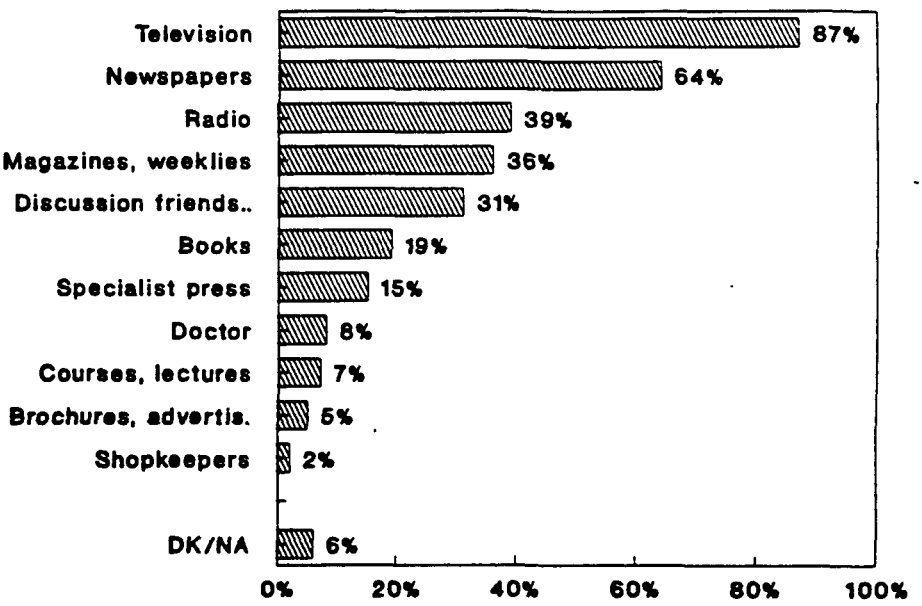
Chapter 4: Information on Biotechnology / Genetic Engineering and on Other New Developments affecting our Way of Life - Which Sources and Who to Trust

Graph 9: Information sources on new developments affecting our way of life (% EC12)

Main source (one response only)



All sources (several responses possible)



Chapter 4: Information on Biotechnology/ Genetic Engineering and on Other New Developments affecting our Way of Life - Which Sources and Who to Trust?

This chapter analyses the results of two questions concerning information on biotechnology / genetic engineering:

> firstly, those concerning the sources that people use to obtain information on "new developments that affect our way of life";
>
> secondly, those concerning the reliability of these different sources in the biotechnology / genetic engineering areas.

These results are, of course, of particular importance given that one of the principal objectives of this Community study (cf. Introduction) is to arrive at better information for the European public in the biotechnology / genetic engineering areas, and from this to arrive at a better understanding of the nature, potential and possible risks of this research.

Table 15 : Information sources on new developments affecting our way of life (national percentages)

QUESTIONS:

A) What is normally your main source of information about new developments that affect our way of life ?
Please select your answer from this list (one answer only).

B) And which are your other sources of information ?
Please select your answer from this list (one answer only).

- Books
- Newspapers
- Magazines, weeklies
- Specialist press
- Radio
- Television
- Company brochures and advertisements
- Discussions with friends, family, colleagues
- Your doctor
- Courses and lectures
- Shopkeepers when buying something

1st column : Question A 2nd column : Question A + Question B	B		DK		D-WEST		D-OST		D-GESAMT		GR		E		EC12	
	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B
Books	6	18	4	17	5	22	4	22	5	22	6	20	5	15	5	19
Newspapers	21	59	38	86	20	63	16	64	20	63	19	67	16	46	23	64
Magazines, weeklies	12	45	3	17	12	51	14	53	12	52	3	23	4	16	7	36
Specialist press	2	12	8	27	7	21	6	20	7	21	2	7	3	11	4	15
Radio	4	36	6	54	3	44	5	55	4	46	5	55	6	35	5	39
Television	43	83	37	91	45	88	48	92	46	89	57	90	51	79	48	87
Company brochures and advertisements	0	7	0	7	0	6	0	5	0	6	1	4	0	3	0	5
Discussions with friends,...	4	26	2	39	2	35	2	27	2	33	2	24	3	14	3	31
Your doctor	2	12	0	5	2	13	1	10	2	13	1	5	0	2	1	8
Courses and lectures	4	11	2	16	1	5	1	5	1	5	1	5	1	4	1	7
Shopkeepers when buying smthg	0	3	0	2	0	2	0	3	0	2	0	2	0	1	0	2
DK/NA	3	4	1	1	3	4	2	2	3	4	2	7	11	18	3	6

1st column : Question A 2nd column : Question A + Question B	F		IRL		I		L		NL		P		UK		EC12	
	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B
Books	7	21	7	21	4	15	13	27	2	20	6	16	3	20	5	19
Newspapers	17	54	32	73	27	70	20	53	39	79	9	43	30	78	23	64
Magazines, weeklies	11	38	4	23	4	38	5	23	7	36	4	27	4	28	7	36
Specialist press	5	17	1	4	2	13	6	18	2	11	2	10	3	10	4	15
Radio	6	38	5	44	4	29	6	36	4	44	8	54	5	35	5	39
Television	48	83	42	86	54	91	35	70	41	88	52	78	47	89	48	87
Company brochures and advertisements	1	5	0	3	0	2	0	6	0	8	0	3	1	9	0	5
Discussions with friends, ..	3	33	2	16	3	31	3	19	3	26	4	31	5	39	3	31
Your doctor	1	11	0	3	0	5	1	5	0	5	0	5	1	5	1	8
Courses and lectures	1	8	2	8	0	6	1	6	1	9	1	5	2	10	1	7
Shopkeepers when buying smthg	0	3	0	2	0	2	0	3	0	3	0	4	0	3	0	2
DK/NA	1	4	4	7	2	7	9	17	1	4	14	20	1	3	3	6

4.1 Information Sources on New Developments affecting our Way of Life

As we have observed before, "global optimism" with regard to new technologies (cf. Chapter 1), together with "objective" knowledge of biotechnology / genetic engineering (cf. Chapter 2) are strongly correlated with the principal source used to obtain information on "new developments that affect our way of life".

Table 15 shows that the type of sources used depend strongly on the nationality of the respondent: For example:

> only 2% of the Dutch use books as a principal source, whereas 13% of Luxembourgers use books as a main source;
>
> only 9% of Portuguese have recourse mainly to newspapers, whereas 38% of Danes and 39% of the Dutch use newspapers as a principal source;
>
> 35% of Luxembourgers and 37% of Danes, versus 54% of Italians and 57% of Greeks use television as their main information source.

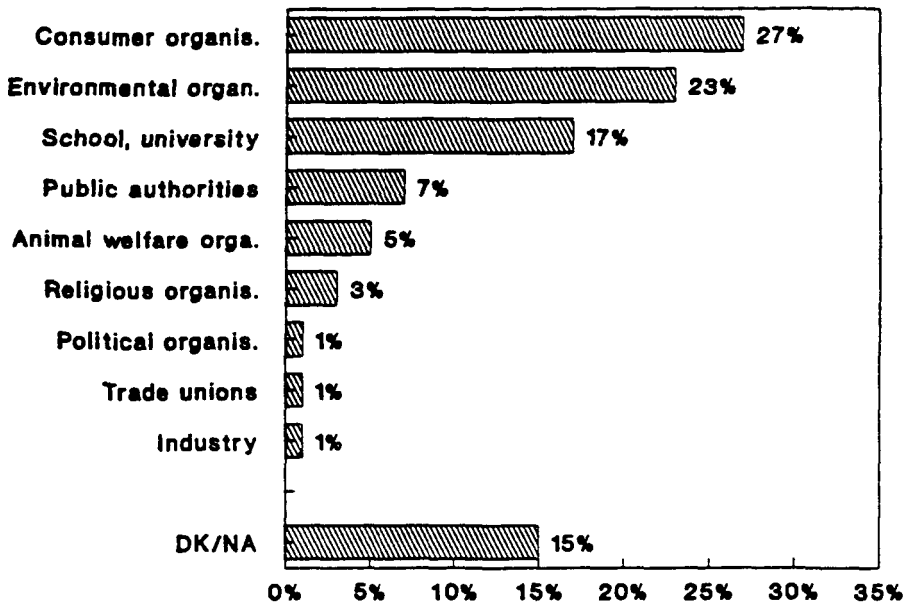
Despite these major difference, we can come to the conclusion that, virtually throughout the Community, television is the principal media source cited, and newspapers the second.

The three "exceptions" - which in fact prove the rule - are:

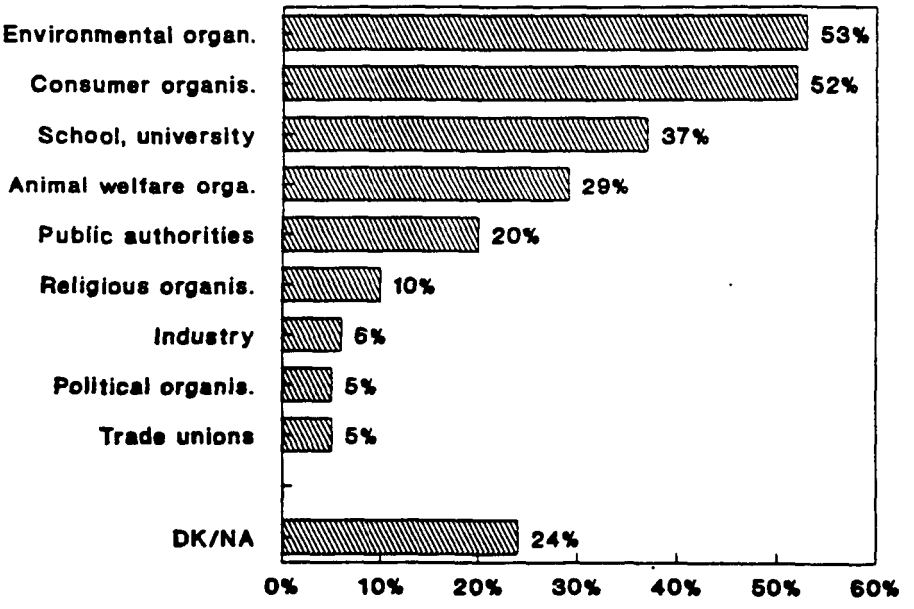
> Denmark and the Netherlands, where these two sources share first place;
>
> the ex-Democratic Republic of Germany, where magazines and weeklies are as frequently cited as newspapers.

Graph 10 : Most reliable information sources on biotechnology/genetic engineering (% EC12)

Main source (one response only)



All sources (several responses possible)



We also note that, regardless of the country, at most 5% of the sample (3% taking the Community as a whole) cite:

company brochures and advertising;

discussion with friends, family and colleagues;

their doctor;

courses and lectures, or;

shopkeepers when buying something;

as a principal source of information on "new developments that affect our way of life".

Table 16 : Most reliable information sources on biotechnology/genetic engineering (national percentages)

QUESTIONS: Which of the following sources of information have you confidence in to tell you the truth about biotechnology/genetic engineering ?

A) Please select from this list the one source you would have most confidence in (one answer only).

B) Indicate also which other sources you would trust to tell you the truth about biotechnology/genetic engineering (multiple answers possible).

- Consumer organisations
- Environmental organisations
- Animal welfare organisations
- Political organisations
- Trade Unions
- Religious organisations
- Public authorities
- Industry
- School of University

1st column : Question A 2nd column : Question A + Question B	B		DK		D-WEST		D-OST		D-GESAMT		GR		E		EC12	
	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B
Consumer organisations	29	52	34	64	32	64	30	63	32	64	12	36	24	45	27	52
Environmental organisations	20	50	16	47	26	61	34	76	27	64	20	48	17	42	23	53
Animal welfare organisations	4	26	7	26	4	34	6	43	5	36	2	16	6	23	5	29
Political organisations	1	3	0	3	2	8	1	4	2	7	1	5	1	3	1	5
Trade Unions	1	5	1	4	1	6	1	6	1	6	1	4	2	6	1	5
Religious organisations	2	6	1	2	4	13	2	8	3	12	3	6	3	6	3	10
Public authorities	5	20	16	39	8	28	7	28	8	28	11	24	6	15	7	20
Industry	1	6	2	6	1	7	0	3	1	6	0	2	2	5	1	6
School or University	24	48	15	38	11	34	12	34	11	34	31	52	17	32	17	37
DK/NA	14	20	7	15	12	15	7	11	11	15	18	29	22	31	15	24

1st column : Question A 2nd column : Question A + Question B	F		IRL		I		L		NL		P		UK		EC12	
	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B
Consumer organisations	41	64	16	42	19	40	24	43	33	63	15	31	21	45	27	52
Environmental organisations	19	52	29	56	25	52	22	46	19	48	19	42	23	49	23	53
Animal welfare organisations	5	32	4	21	4	32	7	23	5	27	4	27	6	22	5	29
Political organisations	1	3	1	7	1	5	3	7	2	7	1	6	1	4	1	5
Trade Unions	1	4	1	7	1	6	1	7	1	6	1	6	1	5	1	5
Religious organisations	2	8	4	12	4	12	3	8	2	7	4	14	4	10	3	10
Public authorities	5	13	6	22	5	15	9	20	9	29	6	18	8	21	7	20
Industry	2	7	1	8	1	6	2	5	1	6	0	5	2	7	1	6
School or University	12	31	21	41	20	41	14	33	17	41	12	31	23	42	17	37
DK/NA	13	26	15	22	17	29	15	32	10	18	37	45	12	27	15	24

4.2 Most Reliable Information Sources on Biotechnology/ Genetic Engineering

Apart from Denmark, by far the three most reliable sources of information on biotechnology / genetic engineering, that is to say the most likely "to tell you the truth", are considered to be:

consumer organisations.

We note that the national percentages relative to these sources range quite widely:

* in Greece, it is only 12%, the same level as public authorities;

* in France, it reaches 41%;

environmental organisations.

Here too, national percentages vary widely between the lowest and the highest levels of support:

* it is very weak in Denmark (16%) and Spain (17%);

* it is very strong in Italy (25%), Ireland (29%), and, above all, in the ex-Democratic Republic of Germany (34% versus 26% in the ex-Federal Republic);

school or university.

Here once again, the national variations are quite considerable:

* the percentages in Denmark, Luxembourg, France, Portugal and Germany never exceed 15%;

* **in Greece** it exceeds 30% (34%).

In Denmark, environmental organisations (with 16%), school and university (15%) receive the same degree of support as the public authorities (with 16%). In comparison with the other countries of the Community, where the degree of support for this latter source never exceeds 9% (except for Greece, with 11%), this seems to be particularly high.

Finally, regardless of the country under consideration, the percentages for animal welfare groups, political organisations, trade unions, religious organisations and industry remain at or below 7%.

Appendix 1

TECHNICAL SPECIFICATIONS FOR SOCIO-DEMOGRAPHIC AND SOCIO-POLITICAL VARIABLES USED IN CROSSTABULATIONS

"OPINION LEADERSHIP"

This variable is based on the answers to the following two questions :

(A) "When you get together with your friends, would you say you discuss political matters frequently, occasionally or never?"

and

(B) "When you, yourself hold a strong opinion, do you ever find yourself persuading your friends, relatives or fellow workers to share your views? Does this happen often, from time to time, rarely or never ?

Interviewees giving affirmative answers to both questions - i.e. those who don't answer "never" to the first and second question - are labelled + +. Interviewees giving negative answers to both questions are labelled -. Categories +- -+ are constituted correspondingly.

"SELF-PLACEMENT ON THE LEFT-RIGHT-SCALE"

This variable is based on answers to the question :
"In political matters, people talk of the "left" and the "right". How would you place your views on mis scale ? (Instructions for interviewer : do not prompt; ring choice ; if contact hesitates, ask him to try again)

Left	1	2	3	4	5	6	7	8	9	10	Right

In this report, respondents are grouped : one third most left, one third most right, and one third centre, for each country. The usual weighting according to each country's population aged 15 and more (cf Introduction) is then applied to establish the EC distribution.

Appendix 2

TECHNICAL SPECIFICATION EB35.1 / FICHE TECHNIQUE EB 35.1

1. CO-OPERATING AGENCIES AND RESEARCH EXECUTIVES/ INSTITUTS ET CHARGES D'ETUDES

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2. EUROBAROMETER SURVEYS

INRA (EUROPE) carries out regulariy the EUROBAROMETER surveys, on request of the COMMISSION OF THE EUROPEAN COMMUNITIES.

INRA(Europe) is a European Network of Market- and Public Opinion Research agencies, coordinated by the European Co-ordination Office (E.C.O.). Avenue R. Vandendriessche 18, B-1150 Brussels.

The results of the Eurobarometer are made available through the Unit "Surveys. Research, Analyses" of the **DG ICC of the Commission of the European Communities.** All requests for further information should be adressed to Mr. Kariheinz REIF, DG X - SRA, "Eurobarometer, Rue de la Loi 200. B-1049 Brussels.

All Eurobarometer data are stored at the Zentral Archiv (Universitàt Kôln, BachemerStrasse, 40, D-5000 Kôln 41). They are at the disposal of all institutes members of the European Consortium for Political Research (Essex), of the Inter-University Consortium for Political and Social Research (Michigan) and all those interested in social science research.

3. EUROBAROMETER 35.1

SAMPLING

Between March 28 and April 25. wave 35.1 of the EUROBAROMETER was carried out It included a section, covering the attitudes towards BIOTECHNOLOGY or GENETIC ENGINEERING, on request of Directorate General XII/F/1 "Science.Research and Development", Concertation Unit for Biotechnology.

In all 12 countries of the European Community, in total 13.149 national citizens (non-weighted figure), of 15 years and over. were interviewed in face-to-face, in their private residence.

2. LES SONDAGES EUROBAROMETRE

INRA (EUROPE) réalise de façon régulière les sondages EUROBAROMETRE à la demande de la COMMISSION DES COMMUNAUTES EUROPEENNES.

INRA (EUROPE) est un réseau européen d'instituts de sondage d'opinion publique et d'études de marché, coordonné par le Bureau de Coordination Européen (E.C.O.), Avenue R. Vandendriessche 18, B • 1150 Bruxelles.

Les résultats de l'Eurobaromètre sont disponibles auprès de l'Unité "Sondages, Recherches. Analyses" de la DG **ICC de la Commission des Communautés Européennes.** Toute demande d'information supplémentaire doit être adressée à Mr. Kariheinz REIF, DG X - SRA, "Eurobarometre". Rue de la Loi 200. B-1049 Bruxelles.

Toutes les données relatives aux Eurobaromètres sont déposées au Zentral Archiv (Universitàt Kôln, Bachemer Strasse, 40. D-5000 Kôln 41). Elles sont tenues à la disposition des organismes membres du European Consortium for Political Research (Essex), du Inter-Universrty Consortium for Political and Social Research (Michigan) et des chercheurs justifiant d'un intérêt de recherche.

3. EUROBAROMETRE 35.1

L'ECHANTILLONNAGE

Entre le 28 mars et le 25 avril 1991. la vague 35.1 de l'EUROBAROMETRE a été réalisée. Elle comprenait un volet couvrant les attitudes vis-à-vis de la BIOTECHNOLOGIE ou du GENIE GENETIQUE, à la demande de la Direction Générale de la "Science. Recherche et Développement", XII/F/1. Unité de Concertation Biotechnologique.

Dans les 12 pays-membres de la Communauté Européenne, au total 13.149 citoyens nationaux de 15 ans et plus (chiffre non pondéré) ont été interrogés en face à face à leur domicile.

COUNTRY/ PAYS	NUMBER OF RESPONDENTS (UNWEIGHTED) NOMBRE DE RÉPONDENTS (NON PONDERE)
Belgique	1021
Danmark	1000
Deutschland (ex-BRD)	1031
Deutschland (ex-RDA)	1046
Ellas	1005
España	1000
France	1070
Ireland	1048
Italia	1074
Luxembourg	509
Nederland	980
Portugal	1000
UK: Great Britain	1059
UK: Northern Ireland	306

The basic sample design applied in ail Member States is a multi-stage, random (probability) one. In all Member States a number of sampling points was drawn with probability proportional to population size. for a total coverage of each Member State, and to population density.

For doing so, the points were drawn systematically from all "administrative regional units", after stratification by individual unit and type of area. They thus represent the whole territory of the Member States according to the EUROSTAT-NUTS 11 and according to the distribution of the national, resident population in terms of metropolitan, urban and rural areas.

In each of the selected sampling points, a starting address was drawn, at random. That starting address formed the first of a duster of addresses. The remainder of the duster was selected as every Nth address by standard random route procedures from the initial address.

In Great Britain, a full random selection of respondents was applied, using electoral registers as sampling basis.

In each household the respondent was selected according to a random procedure, such as the first birthday method or the KISJ-grid. At every such address up to 2 recalls were made to achieve an interview with that respondent. The maximum number of interviews per household is one. All interviews were taken face to lace.

Le principe d'échantillonnage, appliqué dans tous les pays membres est une sélection aléatoire à multiples phases. Dans tous les pays membres, un certain nombre de points de chute ont été choisis avec une probabilité proportionnelle à la taille de la population, pour couvrir totalement chaque état membre, et à la densité de la population.

Les points de chute ont été choisis systématiquement dans chacune des "unités régionales administratives", après stratification par type d'individu et de région. On a repris ainsi le territoire complet de chaque pays membre. selon les régions EUROSTAT-NUTS II et selon la distribution de la population nationale en termes d'urbanisation.

Dans chacun des points de chute, une adresse de départ fut sélectionnée aléatoirement. Cène adresse fut la première d'un duster d'adresses. Les autres adresses du duster ont été sélectionnées comme chaque Nième adresse. par procédure standardisée de "random route" à partir de l'adresse initiale. En Grande-Bretagne. une sélection purement aléatoire des répondants a été appliquée, utilisant **les** listes électorales comme base de sélection.

Dans chaque ménage, le répondant a été sélectionné selon une procédure aléatoire. comme la méthode du premier anniversaire ou la grille dite KISJ. A chaque adresse, jusqu'à 2 revisites ont été effectuées pour réaliser une interview avec la personne sélectionnée. Pas plus d'une interview par ménage n'est admise. Toutes les interviews sont réalisées en face à face.

SPLJT BALLOT

In order to check the effect of the terminology (BIOTECHNOLOGY or GENETIC ENGINEERING) half of the sample (49%) was interviewed using the first term. the other half (51%) using the second term. Per language the following words were applied :

ECHANTILLON DIVISE

Afin de vérifier l'effet de la terminologie (BIOTECHNOLOGIE ou GENIE GENETIQUE) sur la connaissance **et** les attitudes, la moitié de l'échantillon (49%) a été interrogée en utilisant le premier mot. l'autre moitié (51 %). en utilisant le second mot Pour chaque langue, les termes suivants ont été utilisés :

	first expression	second expression
English	biotechnology	genetic engineering
Spanish	biotecnologia	ingenieria genética
French	biotechnologie	génie génétique
German	Biotechnologie	Gentechnologie
Portugese	biotecnologia	engenharia genética
Dutch	biotechnologie	gentechnologie
Danish	bioteknologi	genspleysning
Italian	biotecnologia	ingeneria genetica
Greek	βιοτεχνολογια	γενετικη μηχανικη

REALISATION 0F THE FIELDWORK

In all member States, fieldwork was conducted on the basis of detailed and uniform instructions prepared by the European Co-ordination Office (ECO) of INRA (EUROPE).

REALISATION DU TERRAIN

Dans chacun des pays membres, le terrain a été réalisé sur base d'instructions détaillées et uniformes, préparées par le Bureau Européen de Coordination (ECO) de INRA (EUROPE).

COUNTRY / PAYS	FROM: / DU:	TO:/AU:	POPULATION >15 TOTAL (MILLION) :
Belgique	01/04	22/04	7994.4
Danmark	09/04	22/04	4160.4
Deutschiand (ex-BRD)	03/04	16/04	51 708.0
Deutschiand (ex-RDA)	04/04	15/04	13607.0
Elias	09/04	21/04	7825.6
Espana	04/04	23/04	29 427.2
France	28/03	19/04	43318.5
Ireland	04/04	25/04	2501.3
Italia	04/04	17/04	45902.8
Luxembourg	30/03	25/04	302.6
Nedertand	02/04	23/04	11603.6
Portugal	01/04	16/04	7718.7
United Kingdom	02/04	20/04	45721.1
EC12			271 791.2

COMPARISON BETWEEN SAMPLES AND UNIVERSES AND WEIGHTING OF THE DATA

For each of the countries a comparison between the samples and a proper universe description was carried out. This Universe ascription was made available by the National Research Institutes and by EUROSTAT.

Verification was made for geographical distribution by region and degree of urbanisation. sex, age, marital status and occupation.

For all EC-member-countries a national weighting procedure, using marginal and intercellullar weighting, was carried out based on this Universe description. As such in all countries. minimum sex. age, region NUTS II and size of locality were introduced in the iteration procedure. For some countries extra variables were added, when considered necessary.

For international weighting INRA (EUROPE) applies the official population figures aged 15 years and older as published by EUROSTAT in the Regional Statistics Yearbook of 1988. The total population figures for input in this post-weighting procedure are listed above.

COMPARAISON DES ECHANTILLONS AVEC LA POPULATION ET PONDERATION

Pour chacun des pays. les échantillons furent comparés aux chiffres de la population, à la description de ("univers". Cette description est disponible auprès des Instituts Nationaux et d' EUROSTAT.

Ainsi, ont été vérifiés : la dispersion géographique par région et par taille de localité, le sexe. l'âge, l'état civil et l'occupation.

Pour tous les pays membres, une procédure de pondération nationale fut appliquée, sur des données marginales ou croisées, tirées de cène description d'univers. Ainsi, dans tous les pays, au moins le sexe. l'âge, les régions NUTS II et la taille de l'agglomération furent introduits dans la procédure d'itération. Pour certains pays. des variables supplémentaires ont été introduites si nécessaire.

Pour pondérer au pian international. INRA (EUROPE) applique les données officielles de la population de 15 ans et plus. publiées par EUROSTAT dans l'Annuaire 1988 des Statistiques Régionales. Les chiffres exacts introduits dans cène routine de post-pondération sont résumés dans le tableau précédent.

SUMMARY OF THE COMPARISON OF THE UNIVERSE DESCRIPTION WITH THE WEIGHTED SAMPLES (% DOWN)

RESUME DE LA COMPARAISON DE LA POPULATION CIBLE AVEC LES ECHANTILLONS PONDERES (% VERTICAL)

VARIABLE; CRITERE	UNIVERSE DESCRIPT10N/ POPULATION CIBLE	SAMPLE; ECHANTILLON
SEX/SEXE (*)		
Hommes	**48%**	**48%**
Femmes	**52%**	**52%**
AGEC)		
15-24	**20.4%**	**19.8%**
25-34	**18.0%**	**17.8%**
35-44	**16.2%**	**16.3%**
45-54	**15.0%**	**15.1%**
55-64	**13.7%**	**13.4%**
65+	**16.7%**	**17.6%**

(•) Excluding ex-PRG
Source : EUROSTAT

(*) En excluant ex-RDA
Source : EUROSTAT

ADMINISTRATIVE REGIONAL UNITS

BELGIQUE :

Hainaut
Limburg
Namur
Flandre Orientale
Flandre Occidentale
Liège
Luxembourg
Brabant Flamand
Antwerpen
Bruxelles
Brabant Wallon

DANMARK :

Hovedstadsomradet
Sjaelland, Lolland-, Falster, Bornholm
Fyn
Jylland

DEUTSCHLAND (ex-RFA):

Schleswig Holstein
Hamburg
RB Braunschweig
RB Hanover
RB Lüneburg
RB Weser-EMS
Bremen
Düsseldorf
Köln
Münster
Detmold
Arnsberg
Darmstadt
Giessen
Kassel
Koblenz
Trier
Rheinhessen-Pfalz
Saarland
Nordwürttemberg-Stuttgart
Nordbaden-Karlsruhe
Südbaden-Freiburg
Südwürttemberg-Tübingen
Oberbayern
Niederbayern
Oberpfalz
Oberfranken
Mittelfranken
Unterfranken
Schwaben
Berlin-West

DEUTSCHLAND(ex-RDA):

Berlin-Ost
Rostock
Schwerin
Neubrandenburg
Potsdam
Frankfurt/O.
Cottbus
Magdeburg
Halle
Erfurt
Gera
Suhl
Dresden
Leipzig
Chemnitz

ELLAS :

Kentriki kai Dytiki Makedonia
Thessalia
Anatoliki Makedonia Thraki
Anatoliki Sterea kai Nisia
Peloponnisos & Dytiki Sterea
Ipeiros
Kriti
Nisia Anatolikou Aigaiou

ESPANA :

Anadalucia
Aragon
Asturias
Baleares
Canarias
Cantabria
Castilla-La Mancha
Castilla-Leon
Cataluna
Extremadura
Galicia
Madrid
Murcia
Navarra
Pais Valenciano
Pais Vasco
La Rioja

FRANCE :

Ile de France
Champagne-Ardennes
Picardie
Haute Normandie
Centre
Basse Normandie
Bourgogne
Nord/Pas de Calais
Lorraine
Alsace
Franche-Comté
Pays de la Loire
Bretagne
Poitou-Charentes
Aquitaine
Midi-Pyrénées
Limousin
Rhône-Alpes
Auvergne
Languedoc-Roussillon
Provence-Alpes-Côted'Azur
Corse

UNITES ADMINISTRATIVES REGIONALES

ITALIA :

Valle d'Aosta/Piemonte
Liguria
Lombardia
Milano
Trentino
Veneto
Friuli, Venezia, Giulia
Emilia
Toscana
Marche
Umbria
Lazio
Molise e Abbruzzi
Campania
Puglie
Basilicata
Calabria
Sicilia
Sardegna

IRELAND :

Dublin
Rest of Leinster
Munster
Connaught/Ulster

LUXEMBOURG :

Centre
Sud
Nord
Est

NEDERLAND :

Groningen
Friesland
Drente
Overijssel
Gelderland
Utrecht
Noord-Holland
Zuid-Holland
Zeeland
Noord-Brabant
Limburg
Flevoland

PORTUGAL :

Norte
Centro
Lisboa e Vale do Tejo
Alentejo
Algarve
Azores
Madeira

GREAT BRITAIN :

Cleveland, Durham
Cumbria
Northumberland, Tyne & Wear
Humberside
North Yorkshire
South Yorkshire
West Yorkshire
Derbyshire, Nottinghamshire
Leicestershire, Northamptonshire
Lincolnshire
East Anglia
Bedfordshire, Hertfordshire
Berkshire, Buckinghamshire, Oxfordshire
Surrey, East/West Sussex
Essex
Greater London
Hampshire, Isle of Wright
Kent
Avon, Gloucestershire, Wiltshire
Cornwall, Devon
Dorset, Somerset
Hereford & Worcester, Warwickshire
Shropshire, Staffordshire
West Midlands (county)
Chesshire
Great Manchester
Lancashire
Merseyside
Clwyd, Dyfed, Gwynedd, Powys
Gwent, M-S-W Glamorgan
Borders, Central, Fife, Lothian, Tayside
Dumfries-Galloway, Strathclyde
Highlands, Islands
Grampian
NORTHERN IRELAND

Appendix 3

QUESTIONNAIRE

Passons maintenant à un autre sujet

Ces dernières années, les scientifiques ont beaucoup appris sur le fonctionnement des êtres vivants. Cette connaissance a conduit à des façons nouvelles de modifier les micro-organismes (tels que la levure), les plantes de culture et les animaux d'élevage, ainsi que les cellules du corps humain. La plupart de ces possibilités seront très utiles, mais des inquiétudes existent quant aux risques qu'elles peuvent présenter. Il est nécessaire de décider ce qu'il convient de soutenir, d'éviter ou de contrôler et de définir comment les besoins d'une meilleure information en la matière peuvent être le mieux satisfaits. Nous sommes intéressés de connaître les points de vues de personnes comme vous.

Q.35. La science et la technologie changent notre vie.
— Je vais vous citer une série de domaines où de nouvelles technologies sont actuellement développées. Pour chacun de ces domaines, pensez-vous que cela améliorera notre mode de vie dans les 20 prochaines années, que cela n'aura pas d'effet ou que les choses iront plus mal ?

LIRE		AMELIORERA	PAS D'EFFET	IRA PLUS MAL	NSP
Energie solaire	95	1	2	3	4
Informatique	96	1	2	3	4
Biotechnologie & génie génétique	97	1	2	3	4
Télécommunications	98	1	2	3	4
Nouveaux materiaux	99	1	2	3	4
Exploration spatiale	100	1	2	3	4

EB35.1 - NOUVEAU

Q.36. J'ai ici une liste de développements de ce genre.
Lesquels parmi eux sont à votre avis en rapport avec la biotechnologie & génie génétique ?
Et lesquels ne le sont pas ? (MONTRER CARTE **)

		OUI	NON	NSP
La recherche sur la détection précoce et le traitement du cancer	101	1	2	3
La modification de l'information héréditaire dans un organisme, pour modifier ses caractéristiques	102	1	2	3
La production artificielle de nouveaux types d'organismes, en utilisant l'information héréditaire en provenance d'autres espèces	103	1	2	3
L'amélioration des methodes conventionnelles de fertilisation croisée des plantes ou des animaux	104	1	2	3
L'utilisation d'organismes vivants comme instruments, par exemple la protection des plantes par des micro-organismes (biopesticides)	105	1	2	3
La fabrication de produits alimentaires par des voies telles que l'utilisaton de levure pour la production de pain ou de bière	106	1	2	3
Le traitement de maladies humaines héréditaires par la modification des tissus concernes	107	1	2	3

EB35.1 - NOUVEAU

Let us now discuss another subject

Scientists have in recent years learned a lot more about how living things work. This knowledge is leading to new ways of changing micro-organisms (such as yeast), crops and farm animals , and the cells of the human body. Most of these new possibilities will be very useful, but some concern has been expressed about the possible risks involved. Decisions must be made about what activities should be encouraged, prevented or controlled, and how best to satisfy the need for better information on this issue. We are interested in hearing the views of people like yourself.

Q.35. Science and technology change the way we live.
I am going to read out a list of areas in which new technologies are currently developing.
– For each of these areas, do you think it will improve our way of life in the next 20 years, it will have no effect, or it will make things worse ?

READ OUT	WILL IMPROVE	NO EFFECT	WILL MAKE THINGS WORSE	DK
Solar Energy	95 1	2	3	4
Computers and information technology	96 1	2	3	4
Biotechnology & genetic engineering	97 1	2	3	4
Telecommunications	98 1	2	3	4
New materials or substances	99 1	2	3	4
Space exploration	100 1	2	3	4

EB35.1 - NEW

Q.36. I have here a list of some developments of that kind.
In your opinion, which of these are linked to biotechnology & genetic engineering and which are not ? (SHOW CARD **)

	YES	NO	DK
Research on early detection and treatment of cancer	101 1	2	3
Changing hereditary information within an organism to alter that organism's characteristics	102 1	2	3
Producing new kinds of organisms using hereditary information from other species	103 1	2	3
Improving traditional methods of cross-breeding plants or animals	104 1	2	3
Making use of living micro-organisms, for example for plant protection (bio-pesticides)	105 1	2	3
Food processing such as using yeast for the production of bread or beer	106 1	2	3
Treating hereditary human diseases by modifying the tissue involved	107 1	2	3

EB35.1 - NEW

En fait, la plupart de ces exemples relèvent de la biotechnologie & génie génétique. Je voudrais vous demander plus précisément votre opinion à l'égard de quelques-uns d'entre eux

Q.37. Commençons avec un exemple relatif aux plantes.
Les scientifiques essaient d'utiliser la biotechnologie & génie génétique pour modifier les plantes par des manières qui peuvent être plus rapides ou plus précises que la culture traditionnelle et ceci, afin de rendre ces plantes plus utiles.
Par exemple, pour les rendre plus résistantes aux maladies et aux insectes, pour les faire mûrir plus vite, pour les faire pousser sur des sols secs ou riches en sel...
Veuillez indiquer dans quelle mesure vous êtes d'accord ou pas d'accord avec chacune des affirmations suivantes qui concernent ces recherches sur les plantes (MONTRER CARTE **)

LIRE	TOUT A FAIT D'ACCORD	PLUTOT D'ACCORD	PLUTOT PAS D'ACCORD	PAS DU TOUT D'ACCORD	NSP
Ce type de recherche vaut la peine d'être mené et doit être soutenu	108 1	2	3	4	5
Ce type de recherche peut comporter un risque pour la santé de l'homme ou pour l'environnement	109 1	2	3	4	5
Quoiqu'il en soit, ce type de recherche doit être contrôlé par le gouvernement	110 1	2	3	4	5

EB35.1 - NOUVEAU

Q.38. Voici un exemple relatif aux micro-organismes tels que la levure que nous utilisons pour faire du pain, de la bière, du yoghourt; ou les micro-champignons utilisés pour faire des médicaments tels que la penicilline.
Les scientifiques savent comment modifier ces micro-organismes par la biotechnologie & génie génétique afin d'améliorer leurs performances, c'est-à-dire afin de les faire travailler plus vite ou même de leur faire fabriquer des produits nouveaux.
Veuillez indiquer dans quelle mesure vous êtes d'accord ou pas d'accord avec chacune des affirmations suivantes qui concernent ces recherches sur les micro-organismes (MONTRER CARTE **)

LIRE	TOUT A FAIT D'ACCORD	PLUTOT D'ACCORD	PLUTOT PAS D'ACCORD	PAS DU TOUT D'ACCORD	NSP
Ce type de recherche vaut la peine d'être mené et doit être soutenu	111 1	2	3	4	5
Ce type de recherche peut comporter un risque pour la santé de l'homme ou pour l'environnement	112 1	2	3	4	5
Quoiqu'il en soit, ce type de recherche doit être contrôlé par le gouvernement	113 1	2	3	4	5

EB35.1 - NOUVEAU

In fact, most of these are examples of biotechnology & genetic engineering. I would like to ask you about some of these in more detail.

Q.37. Let us start with an example concerning plants.
Scientists are trying to use biotechnology & genetic engineering to change plants, in ways that may be quicker or more precise than traditional breeding programmes, in order to make the plants more useful.
For example, make them resistant to diseases or pests, make them ripen faster or give them the ability to grow in dry or salty soils.
Please indicate to what extent you agree or disagree with each of the following statements concerning – plant research (SHOW CARD **)

READ OUT		DEFINITELY AGREE	TEND TO AGREE	TEND TO DISAGREE	DEFINITELY DISAGREE	DK
Such research is worthwhile and should be encouraged	108	1	2	3	4	5
Such research may involve risks to human health or to the environment	109	1	2	3	4	5
In any case, this research needs to be controlled by the government	110	1	2	3	4	5

EB35.1 - NEW

Q.38. Here is an example concerning micro-organisms, such as the yeast we use to make bread, or beer, or yoghurt; or the micro-fungi we use to make medicines such as penicillin.
Scientists know how to change these micro-organisms through biotechnology & genetic engineering, in order to improve their performance - that means, getting them to work faster or even to produce new products.
Please indicate to what extent you agree or disagree with each of the following statements concerning research and micro-organisms (SHOW CARD **)

READ OUT		DEFINITELY AGREE	TEND TO AGREE	TEND TO DISAGREE	DEFINITELY DISAGREE	DK
Such research is worthwhile and should be encouraged	111	1	2	3	4	5
Such research may involve risks to human health or to the environment	112	1	2	3	4	5
In any case, this research needs to be controlled by the government	113	1	2	3	4	5

EB35.1 - NEW

Q.39. Certains de ces micro-organismes sont utilisés pour décomposer les eaux d'égoûts et d'autres types de déchets, pour les convertir en des matériaux sans danger pour le sol.
Ici, à nouveau, des scientifiques essaient - en utilisant la biotechnologie & génie génétique d'améliorer ces micro-organismes. Ils essayent les faire agir plus vite ou de leur faire nettoyer des nappes de pétrole ou d'autres contaminations de l'environnement.
Veuillez indiquer à nouveau dans quelle mesure vous êtes d'accord ou pas d'accord avec chacune des affirmations suivantes qui concernent les micro-organismes et l'environnement (MONTRER CARTE **)

LIRE	TOUT A FAIT D'ACCORD	PLUTOT D'ACCORD	PLUTOT PAS D'ACCORD	PAS DU TOUT D'ACCORD	NSP
Ce type de recherche vaut la peine d'être mené et doit être soutenu	114 1	2	3	4	5
Ce type de recherche peut comporter un risque pour la santé de l'homme ou pour l'environnement	115 1	2	3	4	5
Quoiqu'il en soit, ce type de recherche doit être contrôlé par le gouvernement	116 1	2	3	4	5

EB35.1 - NOUVEAU

Q.40. Un autre développement est l'application de ces méthodes à des animaux d'élevage pour les transformer par des manières pouvant être plus rapides ou plus précises que les méthodes traidtionnelles de croisement, afin de les rendre plus utiles.
Par exemple,pour les rendre plus résistants aux maladies, pour les faire grandir plus vite ou pour leur faire produire plus ou une meilleure qualité de viande ou de lait.
Veuillez indiquer à nouveau dans quelle mesure vous êtes d'accord ou pas d'accord avec chacune des affirmations suivantes qui concernent ces recherches sur les animaux d'élevage (MONTRER CARTE **)

LIRE	TOUT A FAIT D'ACCORD	PLUTOT D'ACCORD	PLUTOT PAS D'ACCORD	PAS DU TOUT D'ACCORD	NSP
Ce type de recherche vaut la peine d'être mené et doit être soutenu	117 1	2	3	4	5
Ce type de recherche peut comporter un risque pour la santé de l'homme ou pour l'environnement	118 1	2	3	4	5
Quoiqu'il en soit, ce type de recherche doit être contrôlé par le gouvernement	119 1	2	3	4	5

EB35.1 - NOUVEAU

Q.41. Les scientifiques peuvent aussi appliquer la biotechnologie & génie génétique aux animaux afin de développer des "médicaments vitaux" ou afin d'étudier des maladies humaines. La protection des animaux est garantie par la loi, et certaines personnes disent qu'il est moralement inacceptable d'appliquer la biotechnologie & génie génétique à des animaux. Laquelle des opinions suivantes est la plus proche de votre idée personnelle sur le sujet ? (MONTRER CARTE ** - UNE SEULE REPONSE)

Appliquer la biotechnologie & génie génétique aux animaux est moralement acceptable, pour autant que le bien-être des animaux soit sauvegardé..... 120 1
Il est acceptable pour le développement de médicaments vitaux même si certains animaux en souffrent..... 2
Les autorités publiques devraient examiner cette application de la biotechnologie & génie génétique cas par cas avant de décider si cela peut être autorisé ou non..... 3
Appliquer la biotechnologie & génie génétique aux animaux est moralement inacceptable et devrait être interdit par la loi..... 4

NSP..... 5

EB35.1 - NOUVEAU

Q.39. Some of these micro-organisms are used to break down sewage and other waste products and to turn them into materials harmless to the soil.
Here again, scientists are trying, through biotechnology & genetic engineering, to improve these micro-organisms. They are trying to make them work faster or to make them clean up oil-slicks or other contaminants in the environment.
Please indicate to what extent you agree or disagree with each of the following statements concerning micro-organisms and the environment? (SHOW CARD **)

READ OUT		DEFINITELY AGREE	TEND TO AGREE	TEND TO DISAGREE	DEFINITELY DISAGREE	DK
Such research is worthwhile and should be encouraged	114	1	2	3	4	5
Such research may involve risks to human health or to the environment	115	1	2	3	4	5
In any case, this research needs to be controlled by the government	116	1	2	3	4	5

EB35.1 - NEW

Q.40. Another development is the application of biotechnology & genetic engineering to farm animals, to change them in quicker or more precise ways than traditional breeding programmes, in order to make them more useful: for example, make them resistant to diseases, or grow faster, or produce more or better quality meat or milk.
Please indicate to what extent you agree or disagree with each of the following statements concerning such research on farm animals ? (SHOW CARD **)

READ OUT		DEFINITELY AGREE	TEND TO AGREE	TEND TO DISAGREE	DEFINITELY DISAGREE	DK
Such research is worthwhile and should be encouraged	117	1	2	3	4	5
Such research may involve risks to human health or to the environment	118	1	2	3	4	5
In any case, this research needs to be controlled by the government	119	1	2	3	4	5

EB35.1 - NEW

Q.41. Scientists can also apply biotechnology & genetic engineering to animals to develop life-saving drugs, or to study human diseases. Animal protection is guaranteed by law and some people say it is morally wrong to apply biotechnology & genetic engineering to animals. Which of the following is closest to your personal opinion ? (SHOW CARD ** - ONE ANSWER ONLY)

Applying biotechnology & genetic engineering to animals is morally acceptable, provided that the animals' welfare is safeguarded	120	1
It is acceptable for the development of life saving drugs, even at the cost of some animal suffering		2
Public authorities should examine this application of biotechnology & genetic engineering case by case before deciding whether to allow it		3
Applying biotechnology & genetic engineering to animals is morally unacceptable and should be banned by public law		4
DK		5

EB35.1 - NEW

Q.42. Ces nouvelles méthodes de la biotechnologie & génie génétique sont aussi utilisées dans la production et le traitement des produits alimentaires. Des scientifiques disent que l'on peut améliorer la qualité des aliments et des boissons par exemple avec plus de protéines, moins de graisses, une conservation plus longue ou un meilleur goût.
Veuillez indiquer à nouveau dans quelle mesure vous êtes d'accord ou pas d'accord avec chacune des affirmations suivantes qui concernent de telles recherches sur la nourriture (MONTRER CARTE **)

LIRE	TOUT A FAIT D'ACCORD	PLUTOT D'ACCORD	PLUTOT PAS D'ACCORD	PAS DU TOUT D'ACCORD	NSP
Ce type de recherche vaut la peine d'être mené et doit être soutenu	121 1	2	3	4	5
Ce type de recherche peut comporter un risque pour la santé de l'homme ou pour l'environnement	122 1	2	3	4	5
Quoiqu'il en soit, ce type de recherche doit être contrôlé par le gouvernement	123 1	2	3	4	5

EB35.1 - NOUVEAU

Q.43. Une autre application de la biotechnologie & génie génétique est le développement et la production de nouveaux médicaments et vaccins pour l'être humain, par exemple la production d'insuline humaine pour le traitement des diabétiques.
Veuillez indiquer à nouveau dans quelle mesure vous êtes d'accord ou pas d'accord avec chacune des affirmations suivantes qui concernent ce type de recherche sur des médicaments et des vaccins (MONTRER CARTE **)

LIRE	TOUT A FAIT D'ACCORD	PLUTOT D'ACCORD	PLUTOT PAS D'ACCORD	PAS DU TOUT D'ACCORD	NSP
Ce type de recherche vaut la peine d'être mené et doit être soutenu	124 1	2	3	4	5
Ce type de recherche peut comporter un risque pour la santé de l'homme ou pour l'environnement	125 1	2	3	4	5
Quoiqu'il en soit, ce type de recherche doit être contrôlé par le gouvernement	126 1	2	3	4	5

EB35.1 - NOUVEAU

Q.44. La science essaie aussi d'appliquer certaines des nouvelles méthodes de la biotechnologie & génie génétique aux êtres humains ou à leurs cellules et à leurs tissus, dans des buts divers tels que la détection ou la guérison de maladies, et de caractéristiques que nous pourrions avoir héritées de nos parents.
Veuillez indiquer à nouveau dans quelle mesure vous êtes d'accord ou pas d'accord avec chacune des affirmations suivantes qui concernent ces recherches sur les êtres humains, les médicaments et les vaccins (MONTRER CARTE **)

LIRE	TOUT A FAIT D'ACCORD	PLUTOT D'ACCORD	PLUTOT PAS D'ACCORD	PAS DU TOUT D'ACCORD	NSP
Ce type de recherche vaut la peine d'être mené et doit être soutenu	127 1	2	3	4	5
Ce type de recherche peut comporter un risque pour la santé de l'homme ou pour l'environnement	128 1	2	3	4	5
Quoiqu'il en soit, ce type de recherche doit être contrôlé par le gouvernement	129 1	2	3	4	5

EB35.1 - NOUVEAU

Q.42. These new methods of biotechnology & genetic engineering are also being applied to the production and processing of foods. Scientists say that they can improve the quality of food and drink - for example by making it higher in protein, or lower in fat, or making it keep longer, or taste better. Please indicate to what extent you agree or disagree with each of the following statements concerning such research on food (SHOW CARD **)

READ OUT	DEFINITELY AGREE	TEND TO AGREE	TEND TO DISAGREE	DEFINITELY DISAGREE	DK
Such research is worthwhile and should be encouraged	121 1	2	3	4	5
Such research may involve risks to human health or to the environment	122 1	2	3	4	5
In any case, this research needs to be controlled by the government	123 1	2	3	4	5

EB35.1 - NEW

Q.43. Yet another application of biotechnology & genetic engineering is the development of new medicines and vaccines to improve human health, for example the production of human insulin for the treatment of diabetics.
Please indicate to what extent you agree or disagree with each of the following statements concerning such research on medicines and vaccines (SHOW CARD **)

READ OUT	DEFINITELY AGREE	TEND TO AGREE	TEND TO DISAGREE	DEFINITELY DISAGREE	DK
Such research is worthwhile and should be encouraged	124 1	2	3	4	5
Such research may involve risks to human health or to the environment	125	2	3	4	5
In any case, this research needs to be controlled by the government	126 1	2	3	4	5

EB35.1 - NEW

Q.44. Science is also trying to apply some of the new methods of biotechnology & genetic engineering to human beings, or to their cells and tissues, for various purposes such as detecting, or curing diseases, and characteristics we might have inherited from our parents.
Please indicate to what extent you agree or disagree with each of the following statements concerning such research on human beings, medicines and vaccines (SHOW CARD **)

READ OUT	DEFINITELY AGREE	TEND TO AGREE	TEND TO DISAGREE	DEFINITELY DISAGREE	DK
Such research is worthwhile and should be encouraged	127 1	2	3	4	5
Such research may involve risks to human health or to the environment	128 1	2	3	4	5
In any case, this research needs to be controlled by the government	129 1	2	3	4	5

EB35.1 - NEW

Q.45. Dans quelle mesure vous êtes-vous senti capable de répondre aux questions que je vous ai posées sur la biotechnologie & génie génétique ? Pour repondre, veuillez utiliser cette échelle de 1 à 10. Un signifie "parfaitement incapable", et dix signifie "parfaitement capable". Les chiffres intermédiaires vous permettent de nuancer votre reponse. (MONTRER CARTE **)

1 parfaitement incapable	130	1
2		2
3		3
4		4
5		5
6		6
7		7
8		8
9		9
10 parfaitement capable		10

EB35.1 - NOUVEAU

Q.46. a) En général, quelle est votre principale source d'information sur les nouveaux développements qui affectent notre façon de vivre ?
Veuillez choisir votre réponse dans cette liste. (MONTRER CARTE ** - UNE SEULE REPONSE POSSIBLE)
b) Et quelles sont vos autres sources d'information ? (PLUSIEURS REPONSES POSSIBLE)

	a) PRINCIPALE SOURCE		b) AUTRES SOURCES	
Livres	131	1	132	1,
Journaux/Quotidiens		2		2,
Magazines/hebdomadaires		3		3,
Presse spécialisée		4		4,
Radio		5		5,
Télévision		6		6,
Brochures de sociétés et publicités		7		7,
Discussions avec des amis, de la famille, des collègues		8		8,
Votre medecin		9		9,
Cours, conférences		10		10,
Des commerçants lors d'un achat		11		11,
NSP		12		12,

EB35.1 - NOUVEAU

Q.45. How capable did you feel of answering the questions I asked you about biotechnology & genetic engineering ? Plea answer using this scale from 1 to 10. ONE means "completely incapable" and TEN "completely capable". Please use t full scale of numbers. (SHOW CARD **)

1 completely incapable	130	1
2		2
3		3
4		4
5		5
6		6
7		7
8		8
9		9
10 completely capable		10

EB35.1 - NEW

Q.46. a) What is normally your main source of information about new developments that affect our way of life ? Please select your answer from this list (SHOW CARD ** - ONE ANSWER ONLY).
b) And which are your other sources of information ? (MULTIPLE ANSWERS POSSIBLE)

	a) MAIN SOURCE	b) OTHER SOURCES
Books	131 1	132 1,
Newspapers	2	2,
Magazines/weeklies	3	3,
Specialist press	4	4,
Radio	5	5,
Television	6	6,
Company brochures and advertisements	7	7,
Discussions with friends, family, colleagues	8	8,
Your doctor	9	9,
Courses and lectures	10	10,
Shopkeepers when buying something	11	11,
DK	12	12,

EB35.1 - NEW

Q.47. A présent, je voudrais vous demander quelles sources d'information, à votre avis, vous disent la vérité en ce qui concerne la biotechnologie & génie génétique.
a) Veuillez choisir dans cette liste la source en laquelle vous avez le plus confiance (MONTRER CARTE ** - UNE SEULE REPONSE)
b) Veuillez également indiquer quelles autres sources, selon vous, peuvent vous donner la vérité à propos de la biotechnologie & génie génétique (PLUSIEURS REPONSES POSSIBLES)

	a) LE PLUS CONFIANCE	b) AUTRES SOURCES
Les organisations de consommateurs	133 1	134 1,
Les organisations de protection de l'environnement	2	2,
Les organisations de protection des animaux	3	3,
Les organisations politiques	4	4,
Les syndicats	5	5,
Les organisations religieuses	6	6,
Les autorités publiques	7	7,
L'industrie	8	8,
L'école ou l'université	9	9,
NSP	10	10,

EB35.1 - NOUVEAU

Q.47. Now I would like to know which of the following sources of information you have confidence in, to tell you the truth about biotechnology & genetic engineering.
a) Please select from this list the one source you would have most confidence in (SHOW CARD ** - ONE ANSWER ONLY)
b) Indicate also which other sources you would trust to tell you the truth about biotechnology & genetic engineering. (MULTIPLE ANSWERS POSSIBLE)

	a) MOST CONFIDENCE	b) OTHER SOURCES
Consumer organisations	133 1	134 1,
Environmental organisations	2	2,
Animal welfare organisations	3	3,
Political organisations	4	4,
Trade Unions	5	5,
Religious organisations	6	6,
Public authorities	7	7,
Industry	8	8,
School or University	9	9,
DK	10	10,

EB35.1 - NEW