

- mer seemingly offered an epistemological basis for the argument of the human uniqueness from which our identity derives, while the latter in many respects represented its refutation. Of particular interest are the articles on the 'complexity paradigm' written by scientists, historians, philosophers and scientific journalists published between January and April 1990 in some of Italy's leading newspapers (*l'Unità*, *La Repubblica* and *il Manifesto*), mostly notably Enrico Bellone, Carlo Bernardini, Marcello Cini, Edgar Morin, Enzo Tiezzi, Gianni Mattioli, Massimo Scalia, Pietro Greco, Marcello Buiatti, Laura Conti.
30. This is the document "Respect for Nascent Human Life and the Dignity of Procreation", published in February 1987 by the Congregation for the Doctrine of the Faith under the direction of Cardinal Ratzinger.
 31. From the article by Alexander Langer "La democrazia biologica" published in *il Manifesto* on 6 May 1987. This strategy of 'cross-alliances' had already been announced by Langer at the first national assembly of the Green Lists held in Florence in December 1984. See DELLA SETA R., ref. 8, p. 51.
 32. See SGARAMELLA V. and ZINDER N.D., *Dolly Confirmation*. Science 1998; 279: 635-636; SGARAMELLA V., *La scienza prima e dopo Dolly*. In: SATOLLI R., TERRAGNI F. (a cura di), *La clonazione e il suo doppio*. Milano, Garzanti, 1998, pp. 53-68.
 33. These, moreover, are arguments similar to those used to distinguish between embryos and pre-embryos in the debate on the status of the embryo before and after Dolly. For details see NERESINI F., *And Man descended from the Sheep. The Public Debate on Cloning in the Italian Press*, Public Understanding of Science 2000; 9: 359-382.
 34. The interview was given by the Florentine anthropologist Brunetto Charelli to the weekly magazine *L'Espresso* in May 1987 (pp. 35-57). A heated debate ensued and continued until mid-June, with echoes in the United States. However, as often happens, the story was a canard, as its perpetrator was later forced to admit.
 35. In February 2001, Severino Antinori and Pavos Zavos announced that "within 12 to 24 months we will be able to clone a human being" (*L'Espresso*, 22 February 2001, p. 42). They repeated the announcement in speeches made at a conference held at the University of Rome the following May, receiving huge media coverage and provoking a storm of protest.
 36. This emerges from the survey on biotechnologies and public opinion conducted by the Eurobarometer in 1999, and from the research study "Biotechnologies and Public Opinion in Italy" conducted in 2001 by Poster Research Centre under the scientific supervision of Massimiano Bucchi (University di Trento), Federico Neresini (University of Padua) and Giuseppe Pellegrini (University of Padua) in collaboration with Gianino Bassetti Foundation for Responsibility in Innovation. A synopsis of the English results and a full report in Italian are available at www.poster.it/biotech.html. See BUCCHI M., *Critical but Striving to be Involved: the Paradoxes of Public Attitudes to Biotechnology in Italy*, this issue.
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CRITICAL BUT STRIVING TO BE INVOLVED:
 THE PARADOXES OF PUBLIC ATTITUDES
 TO BIOTECHNOLOGY IN ITALY

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SUMMARY

Using the results coming from two large surveys conducted in 2000 and 2001 on attitudes and opinion to biotechnologies in Italy, the paper focuses on the relationship between media exposure to science communication, level of information and attitudes to biotechnologies. It is suggested that certain commonplace arguments in this area – eg. that public opposition to certain biotechnologies is only due to ignorance – should be reconsidered. A strong demand on the part of the public to be involved in decisions regarding biotechnologies contributes to delineate a rather complex and articulated picture of Italian public opinion and attitudes, which cannot be dismissed as purely antiscientific and hostile.

1. Introduction

During the last years, the emergence of a series of issues with great impact on public opinion – from the repeated Bse alarms, to the debate on Gmos, cloning and embryo research – have pushed the themes of public perception and public awareness of science into the Italian public debate and political agenda. Several scientists and commentators have lamented the presence of a widespread lack of information, attributing the attitudes of public opinion to a misrepresentation of science issues in the mass media and to the insufficient awareness of science on the part of the public¹.

Key words: Biotechnology - Public attitudes - Media Exposure - Public Understanding of Science

Unlike in other countries – where surveys of public perception and attitudes to the science enterprise have long become a consolidated effort of several institutions – this debate has however been conducted in the almost total absence of reliable empirical data.

This paper intends to fill at least partially this gap, being based on the results coming from two extended surveys – the first of this type in Italy – on attitudes and opinion to biotechnologies.

The two surveys were conducted in 2000 and 2001 on a sample of 1022 and 1017 subjects, representative of Italian population above 18 years of age². Data collected give interesting insights on a series of issues at the centre of public debate such as cloning, research on embryos and Gmos. Particular attention was devoted to the relationship between media exposure to science communication, level of information and attitudes to biotechnologies.

2. Media exposure, Information and Attitudes to Biotechnologies

The percentage of Italians who had heard about biotechnologies in the three months prior to the interview dropped from 64% to 50% between 2000 and 2001, probably due to the salience of other issues in the news and to the fact that while in 2000 biotechnologies were still a ‘new’ topic for Italian public opinion, they have by now become almost a routine part of news coverage. While the daily press, magazines and radio are stable in their citation as an information source on biotechnologies, TV seems to have reduced its role in this respect - 82% of 2000 respondents declared they had heard about biotechnologies on Tv, against 69% of 2001.

This incorporation of biotechnologies in the Italian news agenda does not seem to have had an impact on the public level of information, which is stable, if not decreasing. Today, approximately one third of Italians think that “*only genetically modified tomatoes contain genes, while ordinary tomatoes don’t*” and 37% think that “*genetically modified animals are always bigger than normal ones*” – they were 31% in 2000. If we add that, on average, another four Italians over ten patently admit their

ignorance on this matter (“don’t know”), around two-thirds of the Italian public seem to be characterized by a lack of information on biotechnologies.

However, one of the first aspects emerging from both surveys with particular clarity is that even significant exposure to science in the media (TV programmes about science, reading science news in the daily press, books and magazines about science) does not *per se* guarantee a higher level of information on biotechnology issues.

The proportion of subjects who think that “*only genetically modified tomatoes contain genes while ordinary tomatoes don’t*”, for example, is almost identical in those with high (29 %) and low (31 %) exposure to science in the media. More than a quarter of the ‘regular’ consumers of science in the media (28%) cannot give more than one correct answer to five questions about biotechnologies, and more than a half (57%) cannot give more than two correct answers.

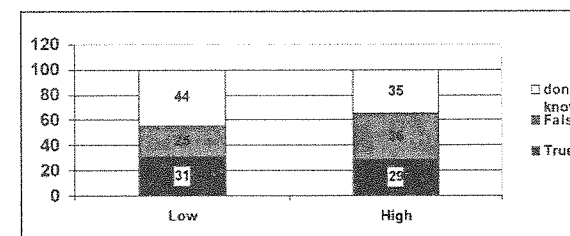


Fig. 1. “Only genetically modified tomatoes contain genes while ordinary tomatoes don’t” by level of exposure to science in the media.

Slightly more visible differences can be observed with regard to other items; however, it is worth noticing that more than one fourth of the ‘regular’ consumers of science in the media (28%) cannot give more than one correct answer over five questions about biotechnologies, and more than a half (57%) cannot give more than two correct answers over five questions³.

Tabella I – Level of information on biotechnologies and exposure to science in the media (%, N = 1017).

	Exposure to science in the media		
	Low	High	Total
All answers incorrect	8	5	7
1 correct answer over 5	43	23	36
2 correct answer over 5	27	29	28
3 correct answer over 5	16	22	18
4 correct answer over 5	6	16	9
5 correct answer over 5	1	5	2

If we turn to the relationship between media exposure and attitudes to biotechnologies, it is interesting to notice that not only high exposure to science in the media does not significantly reduce opposition to biotechnology applications - such as *“taking genes from plant species and transferring them into crop plants, to make them more resistant to insect pests”* or *“Introducing human genes into animals to produce organs for human transplants, such as into pigs for human heart transplants”* - but links with greater criticism with regard to certain areas and applications - such as embryo research and cloning as a means to allow infertile women to have children.

Here not only the percentage of those hostile is quite similar among the two groups (65% of the more exposed and 66% of the less exposed consider embryo research risky), but on certain judgements the relationship between consumption of science in the media and judgements seem to be reversed.

Those who deem ethically unacceptable research on embryos, for instance, are in greater proportion among the most exposed subjects (64% vs. 59% among the less exposed); 80% of regular consumers of science in the media consider reproductive cloning useless (76% among low consumers).

One could easily argue that media exposure to science does not per se mean accurate information. As a matter of fact, complaints about the quality of science coverage by the mass media are just as frequent. Indeed, if we isolate those subjects who are exposed to at least one high-quality source of public communication of science (eg. the Italian edition of *Scientific American*), the association between exposure and attitudes becomes slightly more straightforward. However, this only highlights a well known paradox of public communication of science: messages with greater impact reach only a small minority of subjects, most of whom already have the necessary information⁴.

If we turn to consider the link between the level of information on biotechnologies and attitudes, the picture changes slightly and some differences in attitudes can be seen, with those more informed generally more open to consider biotechnology applications useful, not risky, and morally acceptable. Still, a good level of information does not in itself guarantee a positive attitude: 49% of those better informed think that transferring genes into fruit or vegetables is useless, and 54% think it is risky. Moral acceptability of embryo research does not vary at all with information (60% in both groups consider it unacceptable), while cloning for reproductive purposes is even more severely judged by the more informed⁵.

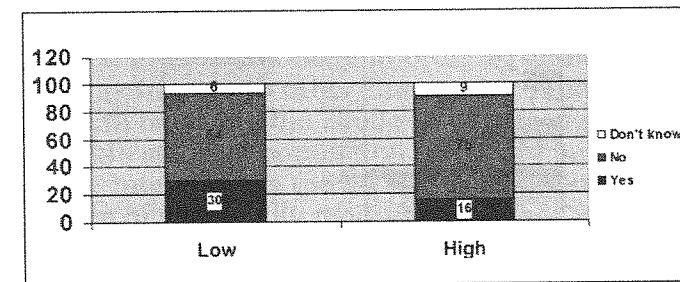


Fig. 2 - Moral acceptability of cloning to help infertile women have children / level of information on biotechnologies.

Quite interestingly, a higher level of information is associated with the request of a stricter state regulation on biotechnologies, as well as with the belief that regulation should not be left either

to enterprises or to scientists alone. The better informed also incline to choose consumer organisations and scientists as the most reliable information sources.

3. Regulation and trust: who should decide?

Whom do Italians trust with regard to biotechnologies? The long term trend seems clear, with consumer organizations strengthening their leading role with time: 42% now consider them trustworthy. Universities and scientific institutions also increase their visibility, being now considered trustworthy by 20% of interviewees, while in relative terms the recover by public institutions is also striking (from 2% of 2000 to 10% of 2001).

On the other hand, environmental organizations are losing credibility in this area: on top of the list according to Eurobarometer 1996 data, they have fallen back to the third place, being trusted by 18% of respondents.

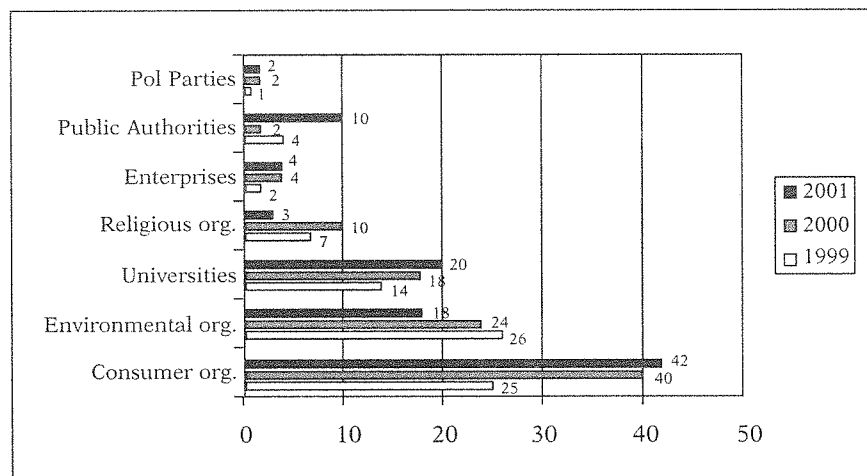


Fig. 3 - Most trustworthy information sources on biotechnologies 1996-2001.

The above data become particularly interesting if read on the face of the still moderate visibility that consumer organizations have in Italy, compared to Northern European countries, in terms of public agenda and of longstanding distrust in public authorities that characterizes Italian public opinion⁶.

It is worth noting, among other things, a sharply decreasing trust in religious organizations (from 9% to 2.8% in one year span of time).

We could speculate, in this respect, that the public approaches biotechnology issues – in particular, certain types of biotechnologies such as the ones related to food and agriculture – not as scientific issues, and not either much as ethical issues but mostly as political and consumer issues.

In other words, Italians do relate to biotechnologies mainly as citizens and consumers – which could well explain also the very critical attitudes to GMOs: as consumers, the advantage of biotech innovations in this field is still unclear to them.

Such attitudes obviously reflect on the judgements expressed on the theme of biotechnology governance.

Italians do not feel protected enough by the existing regulations from possible risks connected to biotechnology use: 72% think that current laws are inadequate. Almost all the subjects interviewed (95% with a further increase compared to the 2000 survey) agree that GM food should have specific labels.

Little agreement seems to exist on the need to accept some risk connected to biotechnology in order to allow Italian industry to be competitive with other European countries (19%, with a decrease with regard to the 2000 survey), or in order to help to feed the world's starving population. It should be noted that one out of three interviewees (38%) would in no case allow commercialisation of genetically modified food, not even if risks and benefits would be clearly detected.

A vast majority (81%) think that scientists should not be completely free to conduct research on biotechnologies; two out of three (63.9%) believe that decisions in this field should not be taken by private enterprises but by central political institutions such as the government.

The most interesting aspect, however, which comes out with particular evidence from the latest edition of the survey, is a

strong commitment on the part of public opinion to be actively involved in these processes. Several studies, in Italy and abroad, have highlighted this shift from 'passive reception' to a demand of participation as one of the major features of contemporary public attitudes to science⁷.

It is quite clear that the Italian public, however misinformed and critical, wants to have a say in the decision making process regarding biotechnologies. Answers to the question 'who should decide?' surprisingly place 'all citizens' at the second place (22%), right after 'the government' and even before the scientists themselves (20%). 'All citizens' are also the most cited category when it comes to indicating who should be consulted before deciding on biotech research and applications: 23% think that the opinion of the general public should be taken into account, again, ahead of scientists (22% think they should have a voice in the decision process), consumer associations (16%) and other organizations aiming at protecting citizens (11%). Entrepreneurs and environmental associations, in this respect, are cited only by 8% and 7% respectively.

This willingness to take part in the decision of making process is confirmed by the fact that more one quarter (28%) of interviewees would like to participate in a public event (forum, consensus conference) to discuss biotechnology issues with scientists, politicians and journalists.

This demand for involvement contributes to delineate a rather complex and articulated picture of Italian public opinion and attitudes with regard to biotechnologies, which cannot be dismissed as purely antiscientific and hostile⁸.

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 5. On the relationship between media exposure, information and attitudes see also BUCCHI M. and NERESINI F., *Biotech is least loved by the more informed*. Nature 2002; 416: 261.
 6. See for instance the IARD extensive surveys on youth condition, where public institutions always fare poorly in terms of trust in comparison to other institutions and categories (BUZZI C. and CAVALLI A., *Quinto Rapporto IARD sulla condizione giovanile in Italia*. Bologna, Il Mulino, 2002). Scientists have been at the top of this rank for the past two editions of this survey, being considered by far the most trustworthy category.
 7. See for instance EPSTEIN S., *The Construction of Lay Expertise. AIDS, Activism and the Forging of Credibility in the Reform of Clinical Trials*, Science Technology and Human Values 1995; 20 (4): 408-437. BUCCHI M., ref. 4.
 8. In general terms, in fact, trust in science and scientists seem to be fairly high: 58% (a proportion stable between the two editions of the survey) agree that "scientists should be trusted because they work for the benefit of mankind".

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