A layperson's guide to decoding science and health stories

Produced as part of the EU-funded *MESSENGER* project
September 2006

The Social Issues Research Centre
28 St. Clements Street
Oxford OX4 1AB
United Kingdom
Email:group@sirc

Amsterdam School of Communications Research
East Indies House (OIH)
Kloveniersburgwal 48
1012 CX Amsterdam, The Netherlands
Email: ascor@fmg.uva.nl

The MESSENGER project was funded as a Specific Support Action by DG Research – Science in Society, Contract No. 013590

Further copies of this guide, together with the full MESSENGER report, can be downloaded from http://www.messenger-europe.org and may be distributed freely.

We welcome feedback on the all aspects of the MESSENGER project. Comments can be sent to: feedback@messenger-europe.org

Introduction

In Europe we live in societies that are increasingly reliant on scientific progress and innovation – from communication technologies that enable the rapid spread of knowledge to developments in medicine that mean that we live longer and healthier lives than at any other time in our history. But how do we get to know about what is happening in the science and health fields? Where do we turn for information, help and advice in seeking to make sense of the evermore complex worlds in which we live and the understandable anxieties that arise as a result?

Few of us read the specialist journals through which the 'real' business of science is conducted, although a number are now accessible for free online – see, for example, the Public Library of Science at **http://www.plos.org/**. Instead, we rely mostly on the more popular channels of television, radio, newspapers and magazines. Scientific knowledge and advice comes packaged along with the rest of the news. Newspaper editors and television programme producers tend to be as interested in maintaining readership and viewer ratings as they are in ensuring genuinely balanced coverage of science and health issues. A story that hails a 'miracle cure for cancer' is more likely to attract attention than one which simply observes that a study conducted on 10 mice suggests a potential for further investigation of the effects of a particular chemical in humans, but it will be at least ten years before we know if it will work.

Science and health stories, then, need to be 'decoded' – we need to look past the headlines, which are not usually written by journalists themselves but by sub-editors – and find ways of evaluating what is written or what is presented on our TV screens. This is not to say that we should be cynical about media coverage of science – without such reporting our knowledge and understanding would be very much diminished. Uncritical acceptance of science news, however, and its implications for our personal lives, is equally unwise. So how do we sort the wheat from the chaff? Who should we believe, and what kinds of story should we take with a healthy pinch of salt?

The EU-funded MESSENGER project involved extensive consultation with individuals and organisations across the European Community, including scientists and journalists but also members of government agencies, NGOs, pressure groups and civil society bodies (all of the reports and materials from the project can be found at **www.messenger-europe.org**). From their valuable contributions we have distilled some basic guidelines that may be of help to us all.

What is the source?

All media reports should clearly state the sources on which they are based – the organisation that has conducted a study or the individual who is making a particular claim. They should also say whether the study has been published in a scientific journal. In this case an article should also say whether the journal in question is 'peer reviewed' – each paper being carefully scrutinised for errors and faults by other experienced scientists. If such information is absent, then the credibility of the article should be questioned immediately.

Assuming that the source is quoted, and any publication details provided, further questions need to be asked. Is this an independent, academic organisation or are there some 'vested interests' here. A study of the health impacts of smoking funded by a big tobacco company, for example, may reasonably arouse suspicion. But there are other types of vested interest that are less easy to identify, including moral, religious, political and ideological stances that may distort the way in which the findings are presented. An alleged 'link' between

abortion and subsequent breast cancer, for example, might be given less credence if the source is a pro-life organisation rather than a government-funded medical institute.

Sampling

Poor medical science coverage in the media often neglects to provide us with 'technical details' such as the nature and the size of the sample used in the study. But this is important if we are to assess the extent to which a study might have implications for us as individuals. In some cases a study might have been based solely on experiments with animals – human studies are yet to be undertaken. Or the population used in a study might be very different from the one to which we belong – different gender or age groups for example. Bear these in mind when assessing how relevant the study really is.

Is there a balance?

Good science reporting will usually include comments on the specific study that is the focus of an article from other scientists in the field. While these views often come towards the end of an article or TV report, they are important because they allow particular claims to be put in context. Is the reported finding consistent with other research, or does it add to previous work in a useful and meaningful way? Or does it present a quite different perspective – one that is not shared by other experts in the field? Here the layperson has a problem – who should he or she trust in the debate? Whose view should prevail? All we can do is keep an open mind until we know more.

Can I make sense of alleged risks or benefits

Many science and health stories include statements about the risks or benefits that have been demonstrated in studies. These might vary from the health risks associated with being overweight to the statistical probability of the Earth being obliterated by a large asteroid. Some stories might also report the alleged benefits to health resulting from, say, a low-fat diet or a particular form of exercise.

Here journalists, and scientists themselves, have some difficulty because it is not always easy to describe these risks in a way that is unambiguous and meaningful. Take, for example, a real study which found that taking a particular type of pain killer can increase the risk of having a heart attack. Press reports indicated that the risk is doubled – this is known as the 'relative' risk. But what we also need to know is the *absolute* risk – the probability of having a heart attack if we do not take the painkiller.

Good journalists and broadcasters will seek to explain the risk in terms of the number of extra heart attacks that result. So, although the risk in this case has doubled (sounds alarming), the absolute risk of heart attacks, 3 per 1,000 people, is increased to 6 per 1,000 among those using the painkiller.

Even this information, however, is insufficient in many cases to allow us to make a properly informed decision about whether or not to take the painkiller. The risks are often not evenly distributed. In this study it was clear that the risks only occurred among those taking high doses of the medicine – those taking lower doses had little to worry about. It was also the case that those on the high doses were experiencing such chronic pain that the relief afforded by the drug was seen to outweigh the increased risk of the heart attack.

The point here is that before we start to panic about risks to our health, personal safety or the state of the planet as a result of reading newspaper headlines, we should pay attention to the details of the report. Good articles and TV reports will give us the right kind of information towards the beginning. In some cases,

however, it is tucked away at the end. The same principles apply to assessing reported benefits such as those resulting from 'medical breakthroughs', 'wonder drugs' and the like.

Suspicious terms

Quite often a newspaper headline announcing a science or health story will include words such as 'link' or 'trend' or claim that an 'association' has been found between, say, eating particular types of food and ill health. These terms often indicate that the results being reported are not statistically significant – they could be the result of chance or random fluctuation. When the results are unequivocally significant we usually find headlines such as 'Scientists prove that X causes Y'.

Results that are *statistically* significant, however, do not necessarily mean that they are 'significant' to us as individuals. A statistical test may demonstrate that there is, indeed, an observed effect which cannot be attributed to pure chance. But the effect, in real terms, may still be very small – something that is unlikely to affect many people very often. Good journalists and broadcasters should be able to explain this true significance by putting the study into context, especially where a risk is involved. How does it compare with other known dangers with which we are presented, such as being struck by lightning (very dangerous but very rare) or tangible benefits such as winning a lottery (very advantageous but equally unlikely).

Check it out

Widespread access to the internet means that there is no longer a need to rely solely on the papers or television for scientific information and advice. We can all go on the web and find it for ourselves. Here, however, arise many pitfalls. How can we tell if a web site, particularly a medical or consumer health site, is reliable and gives us accurate information and balanced advice? There are a number of factors we should consider. Firstly, who runs the site and why? This should be clearly declared on the site, otherwise avoid it. Secondly, who offers links to the site and what references are quoted? Are these, say, government health departments or respectable academic institutions, or are they just similarly minded or 'alternative' groups? It is also worth checking how frequently the site is updated – medical science moves on and we need access to up-to-date advice rather than old news.

Engage!

There is also no longer a need to be a passive recipient of science news and advice. Increasingly, national government bodies, the European Commission and the major science and health institutions across Europe are encouraging the public to become more involved in dialogue about scientific and technological developments and innovation. Scientists are also being urged to communicate their work more clearly to a wider public and to be prepared to discuss issues arising from their research more openly and directly. The MESSENGER project has developed guidelines for scientists on this aspect of their work which can found at www.messenger-europe.org.

Many events, open consultations and dialogue initiatives are held across Europe every year and various web sites provide information about them. A number of the most significant resources are also listed on the MESSENGER web site.