



Take concepts of chemistry out of the classroom

The public image of chemistry is not as negative as some assume — but many people find it hard to connect the field to the real world, says Chiara Ceci.

Much attention is paid to public attitudes to science. But how much do we think about scientists' attitudes towards the public? For members of a profession that thrives on evidence, scientists — and those who communicate, advocate and lobby for science — too frequently rely on incorrect assumptions.

Scientists often believe that the public thinks poorly of them, and perhaps chemists more than most. We assume that people think in stereotypes: men in white coats, explosions and harmful chemicals. We see scare-mongering headlines and misleading advertising about 'artificial' versus 'natural' products. We assume that these messages carry influence, and this shapes everything from the way we hold conversations at parties to more formal efforts in public outreach and education. We are defensive, because we assume that chemistry is under attack.

In fact, public attitudes to chemists and chemistry are much more positive than my colleagues and I would have dared to hope. Our views of public opinion are too negative. I know this because the Royal Society of Chemistry (RSC) has asked members of the public what they think.

The results should cheer up chemists everywhere, and perhaps encourage all scientists to take a more nuanced view of what the public does and does not understand about science.

As part of the study, members and staff of the RSC were asked how they thought the public would respond. The chemists said that public activities should counter the negative stereotypes and myths that surround chemicals. Just over half expected most of the public to say that all chemicals are dangerous and harmful. Some 80% thought that the public would consider chemists unapproachable. And a little less than one-third of the chemists believed that the public would say the benefits of chemistry outweighed the harmful effects. They were wrong.

The results of the study show that the public does not fear or misunderstand chemistry. It does not rave about it either. The majority feeling towards chemistry expressed in the survey was 'neutral'. (Although slightly more people reported positive feelings than negative.)

Overall, three-quarters of people said that chemistry had a positive impact on well-being. A majority agreed that chemistry was part of the solution, not the problem, on issues including sustainable energy, access to food and drinking water, and pollution.

Contrary to our expectations, there were few spontaneous negative associations. Only 1% of the public said that chemistry was boring, difficult or confusing. And only 1% mentioned explosions or blowing things up. Three times as many associated chemistry with "attraction between people".

Research on public attitudes to science and

scientists are relatively common, but work on specific fields, including chemistry, is less so. If we are serious about science communication, we should seek insight into our audience and new ways to measure our impact.

The results of the RSC's study — published this week and available in full at <http://rsc.li/pac> — show that the biggest public challenge facing chemistry is not the need to overturn negative images, but to convince people of the field's relevance. If they have few direct associations with chemistry, people default to memories of school experiences. They see chemistry as an abstract pursuit, rather than a real science.

When asked to describe science more broadly, people used terms such as 'busy' and 'discovery', whereas chemistry was burdened with 'methodical' and 'concentration'. People struggle to imagine how chemistry affects their everyday lives and regard chemists as lacking in

agency: they do not recognize how chemists are involved in the end product of their own work. Chemistry is a "science for scientists", rather than for the public.

Chemistry has long provided insight, building blocks and essential tools that are exploited by researchers in other disciplines. It underpins so many aspects of science that it gets lost. To bridge the distance between chemistry and society, we need to make the field more tangible for people.

How can this be done? A gap between two of the most significant findings offers an opportunity. Although the overwhelming majority of the people polled said that chemistry offered benefits, they did not have much knowledge or experience of how it actually does this. This is a

void that can be filled with positive examples and role models. We are pushing against an open door.

One idea that was popular in the survey was to take chemistry away from the classroom in people's minds and to place it in the kitchen. Food and cooking show people that chemistry is not the sole territory of experts. Members of the public liked the idea that we are all chemists in a way: it builds up their confidence and they start thinking of chemistry as part of life rather than a subject that they will be tested on.

The research threw up one major obstacle for chemistry that may be unique to the United Kingdom. When you tell British people that you are a chemist, it seems that most assume you work in a pharmacy. On these shores, it could be a useful first step for us to say that we are 'scientists who work in chemistry'. More broadly, before chemists or any other groups try to influence public attitudes towards science, it is important that we examine what we think of the public. ■

Chiara Ceci is a science communicator at the Royal Society of Chemistry in Cambridge, UK.
e-mail: cecic@rsc.org

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