



COSY: Communicating Synthetic Biology

Summary of the project results (01.01.2008 – 31.03.2010)

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Background

Scientific findings are often complex and difficult to convey to a broader public. Concrete applications capture attention easier, because risks, benefits, social and moral implications can be accessed via everyday knowledge and reasoning. Hence, scientific information tends to get related to previous knowledge and beliefs through empirical conditioning, knowledge transformation, framing and construction processes. This renders simple models of science communication inadequate. What happens when new scientific insights are conveyed, which issues are taken up and “survive”? And how does this relate to the image of the field in the press and its role for science policy?

Synthetic Biology (SB) is an emerging field applying an engineering perspective to biology. As such it might spark public imagination. In Europe, attention and media coverage is on the rise. Hence, the advent of SB is a live communication experiment: a new field that carries features prone to be the subject of, but not yet determined by value judgements provides an opportunity to study mechanisms of coping with scientific insights.

Methods

With SB as an example, we performed a three-step real time experiment.

1. Seven scientists wrote press releases on their work. Four Austrian journalists were commissioned to write articles thereon and on official press releases.
2. In an experimental confrontation, focus groups of lay people from natural groups (city/rural dwellers of different age, education, ideological background incl. NGO members) were confronted with the coverage and discussed and summarised the reports.
3. Journalists and scientists were confronted with the respective products. At all steps, participants (scientists, journalists, lay people) were interviewed and asked to fill in questionnaires to analyse transformation and framing processes.

In an additional serial reproduction experiment (similar to “Chinese whispers”: a lay person told the article content to another person, who told what he/she had understood to another one etc.) over four generations, we analysed the perseverance of different types of content along the communication chain. Framing processes and the salience of SB-related issues were analysed in existing interviews with SB scientists and in German language print and electronic media between Jan 2004 and Dec 2008. Gender aspects were specifically taken care of. To assess the significance of SB and related ELSA for science policy, the public funding landscapes in several European countries and at EU level were compared.

Results

From the lab via the media to the broader public

The focus group study showed how information trickled from scientists to lay people. Popularisation and framing started early: three of the press releases used hardly any technical terms like gene, genome, genetic, or DNA. Only one text (by the Craig Venter institute) mentioned risks and ethical aspects. The journalists considered possible applications of SB as the most important issues for their readers – accordingly, their main task was to present balanced information about possible risks and benefits. The attention shift to risks/benefits away from scientific insights increased with the focus groups, where ethical issues or risks were paramount. Among the problems addressed were terrorist abuse and biological warfare.

Synthetic Biology in the publics' eye: old wine in new bottles?

Although in their texts the scientists avoided linking their work to traditional biotechnology, in the discussions SB got anchored to it through the focus on applications. Concerns and hopes were similar to those pertaining to genetic engineering 10 or 15 years ago. It appeared as if only now science had caught up with public fantasies already prominent since the 1990s.

The more they know it, the more they diverge

None of the lay participants knew anything about SB on beforehand. While most participants in all groups felt better informed after the discussions, attitudes towards SB diverged differently in various groups. Figure 1 shows this polarization effect.

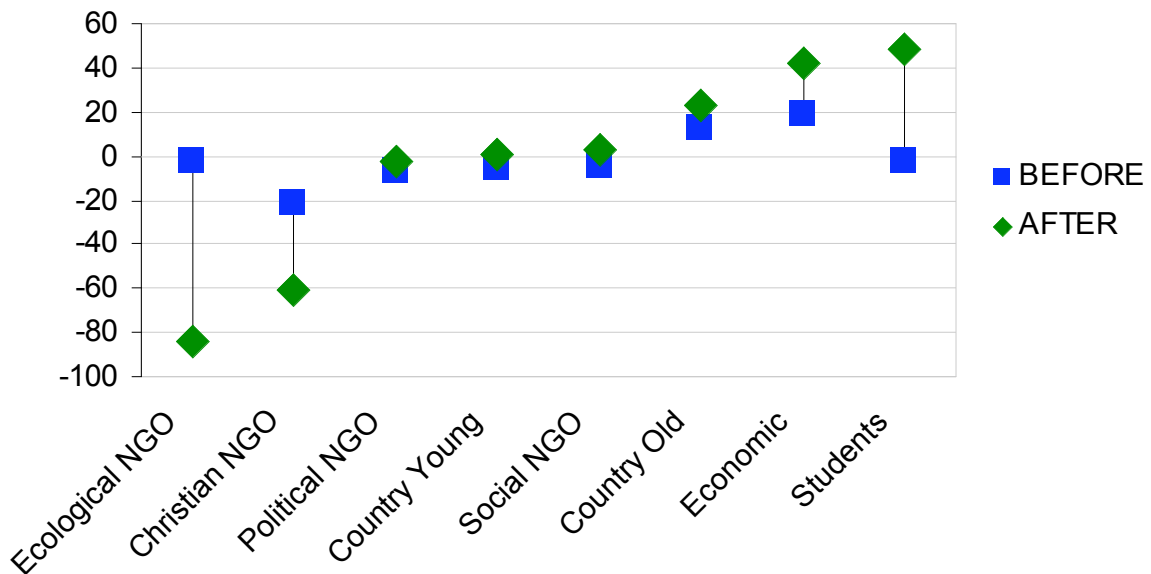


Figure 1: Polarization of group opinions (high values: positive attitudes, low values: negative attitudes to SB)

Pragmatic aspects dominate

Serial reproduction experiments showed that pragmatic aspects (benefits and risks) in a newspaper article survive both technical definitions and moral considerations (Figure 2). Even the substantial novelty of “creating artificial life” reached the last generation in one out of 20 chains only. It was transformed to issues of synthetic substances or genetic engineering.

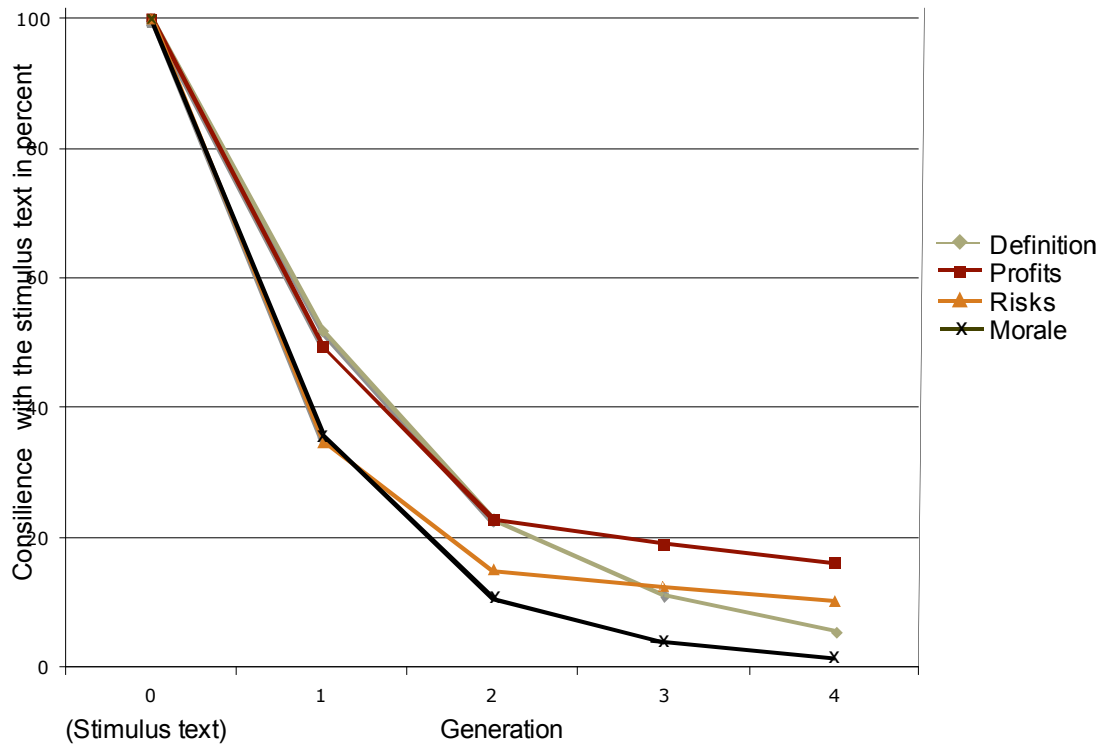


Figure 2: Definition, benefits, risks and moral aspects in all chains.

Media: personalisation and positive ambivalence

SB is still a side issue in the media although it appears recurrently in newspaper science sections and in science online portals, hence for scientifically interested recipients only. The focus tended to shift to applications over concepts here as well, with an emphasis on possible benefits. Media reporting increased over 2007 and 2008 mostly due to articles naming Craig Venter, who was presented with both fascination and repulsion indicative for the coverage of SB in general. Such ambivalence usually indicates that stable attitudes have not yet formed. While the media tended to represent SB as a new field of biotechnology with an engineering-like thinking and a more potential benefits than risk, interviewed scientists mostly defined SB as an endeavour contrasting nature and reflected more on potential risks to be addressed in order to secure the future of the field.

Gender: male SB

Over recent years, female biotechnology students tended to outnumber males in Austria. Despite SB being a new field with many young scientist enthusiasts, a screening of the media revealed a strong gender bias towards male actors, role models and gendered connotations of artefacts. Focus groups dominated by female participant tended to raise the “playing god” metaphor more often. After the discussions, male participants valued SB more decidedly and positively than females, who were more ambivalent.

Divergent funding landscape

SB is a major issue in the US and has been taken up by the European Commission; however, it enjoys different estimation among European countries’ funding agencies (in Austria, France, Germany, the Netherlands, Switzerland and the UK). Both SB-related R&D and ELSA funding varies considerably. Dedicated SB-R&D and/or ELSA scientific communities do not exist in all countries. Only in the UK there is an established funding scheme for both,

successfully integrating research communities. Other countries suffer from a general lack of funding (France), difficulty in funding ELSA (Switzerland), lack of an R&D community (Austria), a small ELSA community only (France, Switzerland, the Netherlands), or a difficulty in linking existing communities with available funding sources (Germany), partly due to an unclear SB definition.

Conclusion

For the public, SB mostly falls under biotechnology with its pros and cons – attitudes appear pre-formed. Concrete risk and benefits are more salient than even morally contentious concepts. As an engineering field, SB remains rhetorically male dominated. Yet even bold novelties seem unsurprising – they had been expected from “old” biotechnology already. Thus the news value may be difficult to establish – the media focus on benefits and persons, yet “with a little shiver”, indicating ambivalence. Science policy in Europe appears similarly ambivalent, having not yet decided how to relate to SB on a broad basis.

Project related publications

Published: Schmidt M. (ed.) 2009. Special issue: societal aspects of synthetic biology. *Systems and Synthetic Biology*. Vol.3(1-4). Therein

Schmidt et al. A priority paper for the societal and ethical aspects of synthetic biology. 3-7

Torgersen H. Synthetic biology in society: learning from past experience? 9-17

Kronberger N, Holtz P, Kerbe W, Strasser E, Wagner W. Communicating Synthetic Biology: from the lab via the media to the broader public. *Systems and Synthetic Biology*. 19-26

Cserer A, Seiringer A. Pictures of Synthetic Biology: A reflective discussion of the representation of Synthetic Biology (SB) in the German-language media and by SB experts. 27-35

Schmidt M. 2010. Xenobiology: A new form of life as the ultimate biosafety tool. *BioEssays* Vol.32(4): 322-331

Submitted: Kronberger N. (ed.) *Communicating Systems Biology* (tentative title). Public Understanding of Science. Therein:

Pei L, Gaisser S, Schmidt M. To fund or not to fund? Synthetic Biology in the view of European public funding organisations.

Torgersen H, Hampel J. Gates, Frames and Resonance. Towards a model of public/policy relations in technology controversies.

Cserer A. The leaky pipeline: a matter of public isolation? An observation of the public and scientific framing of synthetic biology.

Gschmeidler B, Seiringer A. Coverage of synthetic biology in German speaking media (tentative title).

Kronberger N, Holtz P, Wagner W. Media Information Uptake and Consequences of Deliberation: Focus Groups' Symbolic Coping with Synthetic Biology (tentative title).

Dissemination activities

The first documentary film on SB and its ELS issues (initiated under a previous project) was finalised under COSY. See: www.synbiosafe.eu/DVD/