DEBATING EVOLUTIONS IN SCIENCE, TECHNOLOGY AND SOCIETY
Ethical and ideological perspectives. An introduction[1]

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Every new advance in science and in technology, every evolution in society, politics and culture brings with it the need to update linguistic resources at different levels in order to be able to talk about them and accommodate new concepts.

At the lexical level, this is a physiological process, as every development inherently involves the introduction of new vocabulary, which in most cases is created directly by the persons involved (scientists, researchers, politicians). This occurs because of the non-arbitrariness of domain-specific lexicon, which in most cases does not result from the spontaneous or accidental evolution of language, but is deliberately produced to name new discoveries, notions and developments.

The introduction of new words and terms is not the whole story. Advances and evolutionary changes may be far-reaching. They will inevitably have an impact on language and discourse that goes well beyond vocabulary and terminology. Changes in patterns of thinking, reasoning and conceptualizing will lead to new representations and new discourses. One example is the introduction of computer information technologies, which have profoundly changed our understanding of many aspects of human life and experience and the way we represent them. Of course, change occurs in every area of human activity or endeavor, and always has. Yet, the pace of change is unprecedented, and often unsettling. While there is no doubt that scientific and technological progress has opened up endless opportunities, and that social changes, as well as the rise of new discursive paradigms in politics and society, appear to hold the promise of a better future, it is equally

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certain that in many cases this seemingly unstoppable progress has come with strings attached. And these strings often have undertones which belong to the domain of ideology, and in some cases of ethics. The latter in particular is a domain already beset with difficulties that are made even more pressing by the fact that in many cases they arise from issues whose nature and implications are difficult for the layperson to understand. Having as clear a grasp as possible of the issues at stake is therefore of crucial importance if the impact and consequences of scientific, technological and even socio-political changes are to be understood.

In light of the above, it is easy to see why language and discourse play a key role not only in the very conceptualization of scientific, technological and social changes, but also in the way in which these are perceived and become (or, as the case may be, do not become) acceptable to society at large.

The articles in this special issue focus on how evolutionary changes in science, technology, society etc. are represented in various types of texts targeting the general public. In all cases, representation involves the transfer of domain-specific knowledge to various non-specialist audiences and its recontextualization (and often entextualization; Silverstein, Urban 1996) in a type of discourse that is very different from the type of discourse in which it was originally cast, if only because it is aimed at disseminating knowledge and making it more accessible.

The process of transformation requires the conceptual and linguistic processing of knowledge for the benefit of the non-specialist. This is why it can never be neutral. Even when the writer has the best intentions in terms of accuracy and honesty, what is provided in each case is one version – often simplified or reduced – of the relevant knowledge among the many versions that could be given. This is even more problematic when the topics and issues dealt with are sensitive or controversial, and at the centre of public opinion or debates.

In this respect, an important notion to be relied on is that of *discursive frame*. Frames are cognitive perceptual structures that either subconsciously or strategically influence participants on how to "hear or how to say" something (Bartel 2010, p. 311). In Entman's (1993, p. 52) words,

> to frame is to *elect some aspects of a perceived reality and make them more salient in communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation and/or treatment recommendation* for the items described (italics in the original).

Thus, frames can be seen as "schemata of interpretation" (Goffman 1974, p. 21) that determine the way people make sense of phenomena, events, evolutions, and perceive their character, causes and consequences. A crucial

element is *salience*, i.e. the prominence given to certain aspects rather than others. i.e. "what is prominently displayed, what is repressed and especially how observations are classified" (Edelman 1993, p. 232).

Therefore, framing, selecting and perspectivising are inevitable in knowledge dissemination and transmission. Rita Salvi's article, which opens the collection of papers in this special issue, highlights the framing role of language and discourse in this process. Salvi defines knowledge dissemination as the transmission of knowledge, which she then conceptualizes as "knowledge translation". She also considers the ethical and ideological implications of this fact by emphasising researchers' responsibilities in the dissemination of knowledge in various domains. This is particularly true in the scientific, legal and economic sectors, because of the values connected with (1) scientific advances, (2) the conflict between ethics and law and (3) the relationship between ethics and economics.

The other papers included in this special issue address different aspects of knowledge dissemination and transmission. They approach the issue from the perspective of discourse analysis. Consideration is given to differences and variations. Other analytical tools such as corpus linguistics, pragmadialectics and cognitive linguistics are used. All of them ultimately focus on the discursive frames through which the topics they deal with are represented, that is, on the discourses and the linguistic resources that are more or less deliberately deployed for the purpose, on the one hand, of making knowledge about a particular topic manageable and, on the other, of orienting recipients' understanding of it. Because of their function as "definitions of situations" (Goffman 1974, p. 10), the identification of discursive frames serves to promote the understanding of those strategies through which developments are constructed in communication.

The implication is that because discourse frames are so effective, they are a powerful ideological instrument, capable of influencing the public perception of the most crucial issues in society. This is especially cogent in the case of the transfer of specialist knowledge about new developments and breakthroughs, where the selection, summarization, reduction or omission of contents is particularly relevant.

One such case is nanotechnologies. In their study of the ways in which these new technologies are represented in two different sets of documents (European Union webpages and Friends of the Earth's reports), Franca Poppi and Cecilia Lazzeretti discuss the different attitudes towards them that can be retrieved in the two corpora. While the two institutions appear to share a utilitarian view of nanotechnologies (in a true popularizing fashion, which typically places emphasis on the practical relevance of a new invention, discovery or technique), they differ widely on the evaluative component attached to their factual description. Whereas the EU is fairly neutral, Friends

of the Earth employ a risk frame which invites caution in the adoption of this technological advance.

Gene editing is another technology which is frequently featured in the media, often in controversial terms. In her study of reporting about gene editing in British and Italian newspapers, Jekaterina Nikitina identifies similar popularization patterns centred around the metaphorical representation of "the genome as text", albeit with some differences due to the translational nature of much Italian terminology. More interestingly, Nikitina also identifies "a paradigm shift" in the representation of discourse on the genome, compared to earlier instances. While DNA sequencing was often framed in the media as a mystery to be decoded, gene editing is usually framed as a useful and beneficial technique which, however, involves some potential risks to our very existence if placed in the wrong hands. This suggests that once the applications of a new discovery begin to gain salience, utilitarian framings become more prominent, and with them – often – framings which highlight risks, as well as benefits.

In Emanuele Brambilla's paper, the representation of risk regards an environmental issue, and the effort at knowledge dissemination discussed has the ultimate purpose of fostering environmentally friendly behaviours. This study focuses on two reports issued by Greenpeace for their "Toxic Tech campaign", a campaign aimed to expose the presence of toxic chemicals in a variety of electronic devices. Both reports raise environmental ethics and environmental health issues. But one of them targets an expert audience, dealing with relatively complex notions of environmental toxicology and chemistry, while the other addresses a wider public of consumers, avoiding technical considerations, and focuses on ranking different electronic device producers according to their commitment to "greenness". Thus, within an overarching discursive perspective highlighting "our duties to nature", the two reports frame the same issue in two very different ways, one dealing with the scientific merit of the issues involved, and the other orienting people's buying choices to the products of more environmentally friendly companies.

Environmental awareness is also at the heart of Ersilia Incelli's study, which looks at eco-cities and how they are represented through specific rhetorical patterns which legitimize or delegitimize stakeholder claims about how to manage certain environmental issues in eco-city projects. The analysis is based on the comparison of two corpora embodying opposite views, a corpus of texts from eco-city project websites created by architectural and structural consultants, characterised by a dominant discourse of certainty, authority and vision, and a corpus representing the environmental science research community, which tends to present a critical attitude towards the eco-city projects, involving a rhetoric of skepticism and caution. It follows that what really lies at the heart of the controversy is a growing awareness of

the difficulty of integrating environmental policies into institutional settings, which entails the translation of an "environment and nature" discursive frame into an economic and monetary one. This highlights the problems raised by the need to integrate environmental discourses into neoliberal conceptual frames.

While the papers examined so far discuss aspects of the dissemination of knowledge on scientific or technological advances and developments, with the following ones attention is shifted from science and technology to sociopolitical change and the way in which it is framed in political and media discourse.

Chiara Degano and Annalisa Sandrelli's paper looks at how regulating decisions made at supra-national level are communicated to the general public in both legal and media discourse. The authors explore the discursive changes occurring in the transposition of EU directives on ethically sensitive issues first into national legislation and then into news reports. In the shift from European-level legal discourse to national transposition measures and, above all, to the press, they notice a change in framing: if in European directives the focus is firmly on technical aspects, and ethical issues are left in the background, in national transposition measures and in news articles the focus is even more clearly on individuals and their existential dimension, leaving legal technicalities aside.

Denise Milizia and Cinzia Spinzi's article focuses on politics and the media highlighting "hot" political change issues in the EU, most notably Brexit. Their study puts an accent on a discursive frame frequently activated in Britain to come to terms with one of the most upsetting and disruptive political changes of the last few years. It points out that, as is often the case with developments that are not easy to grasp and/or to accept, the most widely used discursive frame to represent Brexit is based on metaphor, and specifically in this case on the "divorce" metaphor, which in turn is derived from a more general metaphor, NATION IS A FAMILY. The analysis is based on two corpora, one consisting of political speeches delivered by top level British politicians and another comprised of texts from daily newspapers. While the divorce metaphor is more popular in the media, possibly because of its cognitive value and its potential for moral and ideological reasoning, its use by politicians seems to be more circumspect.

Media discourse is also the topic of Ruth Breeze's article. Breeze investigates the changes occurring in the transfer of scientific knowledge from press releases on scientific advances (which in themselves entail the entextualisation of scientific discourse originally circulated in scientific papers) to news articles. Using an example taken from the domain of science and nutrition, Breeze shows how the vast majority of the media sources she investigates significantly alter the original research on which they are based

by foregrounding selected aspects, typically in the service of a heightened controversial slant. Breeze highlights the ideological implications of these reframing operations, insisting on the importance of media literacy in contemporary society.

In Dermot Heaney's paper the focus shifts to the press coverage of facts and incidents deriving from a recent evolution in sports, that is, the use of allegations of unethical behaviour against certain countries for political purposes, in a context where performance enhancement seems to have evolved from a largely covert activity, practiced by individual athletes and their coaches, into a systemic phenomenon, with the active involvement of the state and national sports federations. Against this background, the framing by the press of doping allegations and related punishing measures plays a crucial role. This is discussed by Heaney with reference to the charges of illegal performance enhancement that led to officially banning Russia from the 2018 Winter Olympics in Pyeongchang. Comparing a corpus of international press coverage and one of articles in English retrieved from the Russian news agency ITAR-TASS, he shows that in the international corpus the events at issue are framed discursively so as to highlight certain stereotypical aspects of Russia's alleged behaviour as opposed to the set of values the international community attributes to itself. In contrast, the analysis of the ITAR-TASS corpus shows that the discursive strategies deployed in the Russian press in English are aimed at reducing the impact of the hostile international campaign on the country's image and repairing damage to its international reputation.

Finally, the last two papers look at discourse framing in research and academic communication.

Michele Sala studies abstracts of research articles in law journals at a time when texts that in the past were explicitly targeted at 'insiders', and particularly at the *esoteric* community (i.e. experts working on similar issues) are now in many cases addressed to the *exoteric* and extended academic community (i.e. scholars in other domains), as well as to a lay audience. Investigating a corpus divided into an esoteric and an exoteric sub-corpus, each in turn divided into two sub-corpora of abstracts dealing respectively with money related and non money related topics, the study shows the important role of reporting verbs as devices for metatextual framing, used to emphasise the authoritativeness of the articles being reported on in terms of research, contribution to the relevant discipline, and argumentative and discursive power. It is also interesting that the reporting verbs are much less frequent in the sub-corpus addressed to insiders, providing evidence that the latter do not need metatextual framing through reporting verbs in order to grasp the validity of their disciplinary contents.

The issue of research and publication ethics is tackled by Girolamo

Tessuto, who looks at a corpus of brief reports on ethically challenging scientific misconduct cases published on the website of the Committee on Publication Ethics, with a focus on their generic structure. In these texts, the misconduct cases are framed with reference to moral and professional standards in social environments of research publishing. The brief account of each case pinpoints responsibilities for the breach of ethical standards and at the same time foregrounds the organisation's ethos, which is aimed not only at sanctioning misconduct, but also at promoting an ethical research and publication culture based on sound moral and professional standards, thus legitimizing the organization's gatekeeping role.

The articles presented in this special issue collectively provide important insights as to the role discourse plays in the dissemination of knowledge about evolutionary changes and developments in a variety of domains, from genetics to nanotechnologies, from European legislation to publication ethics. Through discourse framings, new information, facts and notions circulate within insider communities and are relayed to the general public. The findings presented here confirm that when they go through this process only rarely do they remain totally free from further interpretation, evaluation, or bias; in some cases, the trasmission of value judgements is deliberate, and directed to certain more or less declared aims (e.g. militancy). In others, it may be influenced to a greater or lesser extent by conventional professional practices (as can happen in science popularisation in the press). Invariably, knowledge dissemination is mediated by discourse – and inevitably so. In this scenario, the ethics of communication becomes a top priority, as does the promotion of media and communication literacy among the general public, but also among specialists. Fostering greater awareness of the way in which discourse practices impact on the way knowledge is both created and disseminated is, therefore, a goal that should be pursued by linguists and discourse analysts as a matter of professional ethics.

Bionotes: James Archibald holds a doctorate from the University of Lille; he currently teaches translation at McGill University. His recent publications include "Managing Translation Quality in Multilingual Settings", *Circuit* 133 (2017), "Principes de mise en œuvre de politiques linguistiques intégrées" (OPALE, 2019) and "D'imaginaire en imaginaire" (*Al-Kimiya*. 2019), "Traduire les droits et responsabilités des citoyennes et des citoyens", *Circuit 14* (2019). A *Chevalier in the Ordre des Palmes académiques*, Mr. Archibald is a member of the Conseil supérieur de la langue française, the International Standards Organization's committee on translation and terminology and the Office des professions du Québec.

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