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## Language and the Ingenuity Gap

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Over the past centuries, first Latin and then French, German, and Russian, have receded in perceived importance as languages of science. Other powerful languages, with extensive internal scientific discourse, such as Japanese and Chinese, have always been largely excluded. The dominance of English, brought on by the economic power first of the UK (in the 18<sup>th</sup> and 19<sup>th</sup> centuries) and then of the USA (in the 20<sup>th</sup> and 21<sup>st</sup>), has elevated the reputation of English-language universities and advantaged native speakers of English by creating a self-reinforcing loop of language flow. Abstracting services insist on English-language abstracts; citation indexes often include only English-language citations; thus English appears to dominate scientific discourse, and English-speaking universities invariably head the lists of leading scientific institutions. The inexact assumption appears to be that, with enough pressure, others will simply be forced to learn English in order to compete. In fact, language frequently limits their participation even if they partially master English. Thus scientific advancement circumscribed by the English language is erroneously equated with scientific advancement in general. Valuable work in other languages is often simply lost – among other reasons because native English speakers are unwilling to learn the other languages that they need to access this discourse. Solutions for the reduction of this advantage and the distortions and misperceptions that result from it include the use of a simplified style or form of English, a taxation system whereby the powerful languages assist those who are native speakers of other languages, or the use of an easily mastered neutral language that puts everyone on an equal footing. If this discriminatory situation is to change, first the rhetoric must change: the advantaged must acknowledge their advantage and be open to ways of redressing the imbalance, and discriminatory practices must be acknowledged for what they are.

Ever since the retreat of Latin as the international language of scholarly communication (a medium that had the advantage of belonging to no particular nation, though owned by an international elite of academics and intellectuals), efforts have been made to come up with a similarly neutral and non-partisan substitute – beginning with the dreams of so-called philosophical languages by Descartes, Wilkins, Leibnitz, and Newton in the 17<sup>th</sup> and 18<sup>th</sup> centuries – language systems conceived as exact means of scientific discourse (Eco 1995, Stillman 1995, Rossi 2000). These efforts have carried through into our own day in numerous projects for international languages based on elements from existing languages. None has made the progress that its creators anticipated, though Esperanto has a broad following and is spoken and used internationally (Janton 1993).

In fact, the choice of languages of scientific communication in subsequent centuries has largely been a battle fought by politically powerful nations able to invest in strong scholarly infrastructures and in research and development, and hence able to persuade others to use their national languages. German held its own in science and medicine for many years, in equality with, or ahead of, French and English (see the figures for 1879 in Mair 2006), but has now retreated; only in recent years has French largely ceded the field to English (abandoning its policy of encouraging French academics to publish in French); Russian was for a number of years of some significant importance but has also lost strength, in part because of a weakening of its scientific establishment. Other powerful languages, with extensive internal scientific discourse, such as Japanese and Chinese, have always been largely excluded from international currency. On the other hand, the dominance of English, brought on by the economic power first of Britain (in the 18<sup>th</sup> and 19<sup>th</sup> centuries), then of the USA (in the 20<sup>th</sup> and 21<sup>st</sup>), has elevated the reputation of English-language universities and advantaged native speakers of English by creating a self-reinforcing loop of language flow.

Such self-reinforcement is evident in the language choice of scientific publications. Recent years have seen an acceleration in the use of English in scientific publication (Tsunoda 1983, Baldauf & Jernudd 1983, cited by Carli 2007; Large 1983). By the mid-1990s, according to one source (Mair 2006:10), English was used in 90.7 percent of natural science publications and in 82.5 percent of humanities publications,<sup>1</sup> causing scholars to show a preference for writing in English and, accordingly, for more publications to move to English. Increasingly, university criteria for promotion and permanent appointment in Europe give more credit to publications in English than to publications in other languages, sometimes acknowledging *only* publications in English. One consequence of such policies is to erode the ability of scientists to use their own language in scholarly discourse: they may well lack the terminology to do so. Phillipson (2003:81) documents the dangers of such domain loss in the Scandinavian countries: language atrophy can lead to communication failure “because any information for the general public in a democratic society has to be made available in a local language.”<sup>2</sup> It also, of course, creates a gap between vernacular elementary and secondary education on the one hand and advanced education on the other.

The current dominance of English holds huge advantages for the English-speaking world. The language-teaching industry is dominated by the UK and the US, generating billions of

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<sup>1</sup> Such figures are self-reinforcing in a different way: first we have to define what constitutes a “scientific” publication, and this process of definition may well have its English-language bias. Gaetani quotes Truchot 1996: “Rappelons que s’il y a quelque 100 000 journaux scientifiques publiés dans le monde, dont 50 % sont en anglais, le noyau dur de l’édition scientifique mondiale est constitué d’environ 4 000 journaux, contrôlés à plus des deux tiers par des éditeurs américains, britanniques et néerlandais qui publient presque intégralement en anglais [...] De plus, ce sont les articles de ce noyau dur qui servent de références. Ce sont eux qui sont indexés de manière prioritaire dans les fichiers informatisés, c’est-à-dire dans les banques de données qui ont été constituées pour réunir et diffuser l’information scientifique.”

<sup>2</sup> Carli 2006 is emphatic on the dangers: “La comunicazione scientifica internazionale rappresenta oggi un evidente caso di conflitto linguistico per i radicali e pervasivi fenomeni di riduzione ed estinzione linguistico-culturale in favore di un monolinguisimo anglofono. Questo è ben visibile in numerosi settori della ricerca scientifica primaria, quella altamente specialistica e settoriale, tanto che all’inizio di questo nuovo millennio tutte le lingue diverse dall’inglese, comprese le cosiddette lingue di cultura, ricoprono lo *status* di lingua minoritaria nel dominio della trasmissione del sapere scientifico-specialistico.”

dollars annually for both countries – dollars transferred from non-English-speaking countries.<sup>3</sup> International student flows follow similar channels – from non-English-speaking to English-speaking countries – making English-speaking universities widely known across the world and perhaps investing them with an elevated and undeserved reputation. And if English-speaking countries enjoy the benefits of teaching English to the world, they are also able to spend far less themselves on foreign-language instruction in the schools than their non-English-speaking peers, thereby giving them more time and more money for other pursuits. In fact, national foreign-language readiness in the United States remains dangerously low (Scott 2005), and foreign-language learning, while on the increase, cannot compare with the levels in non-English-speaking countries.

If they wish to enter this English-dominated international scientific community, the scientists of non-English-speaking countries must publish in a language not their own, and incur costs in time and money in having their texts edited into acceptable English (Ammon 2003). If they publish in their own languages, not only will their work be inaccessible to their peers in many other countries, but also it will not be indexed in the major citation indexes because these compilations are themselves dominated by English and often index only English texts or texts abstracted in English. Thus the Social Science Citation Index, the Arts and Humanities Citation Index, and the Science Citation Index, published in the United States by the Institute for Scientific Information, specify that “English language article titles, abstracts and keywords are essential” if a periodical is to be included (Sandalin & Sarafoglou 2004:11). Translation services lag behind in their output, and little material published in languages other than English is translated into English, for lack of demand.

The inexact assumption appears to be that, with enough pressure, others will simply be forced to learn English in order to compete. In fact, language frequently limits their participation even if they partially master English, since it is hard for them to engage fully in the informal communication that is such an important part of scientific exchanges. Thus scientific advancement circumscribed by the English language is erroneously equated with scientific advancement in general. Valuable work in other languages is often simply lost – among other reasons because native English speakers are unwilling to learn the other languages that they need to access this discourse.

When international rankings of major research universities are made, universities in English-speaking countries score best, and countries whose languages have little or no international circulation, and whose scientists are accordingly obliged *from the beginning* to master a foreign language (normally English), tend to come in behind the leading English-speaking countries and ahead of countries whose languages have significant international currency or a critical mass of in-country speakers, such as German, Italian, French, and Spanish (there are, of course, some notable exceptions). A major reason for this discrepancy is the self-reinforcing loop of language flow: English circulates widely, is indexed and hence is cited; English is cited and hence is indexed and hence circulates widely. The Shanghai Jiao Tong rating of universities (one of the two best-known of such ratings) relies for 20% of its scores on the

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<sup>3</sup> Phillipson 2003:77 cites British Council figures indicating that over 550,000 foreigners attend language schools in Britain each year. The Council claims that the “English language industry” (teaching, publishing, etc.) is the second most important income-generator for Britain after North Sea oil.

three citation indexes published by the ISI. A further 20% relies on publication in two English-language journals – *Science* and *Nature*.

The other leading university rating of wide currency is the THES/QS Top Universities Rating, based in the UK. It relies heavily on peer rankings (40% of the scores) and on rankings by employers (10%). As far as I can tell, communications with these peers and employers are conducted in English and the majority of them seem to come from English-speaking backgrounds. Given also the strong position of English-speaking universities as international training institutions, it is hardly surprising that these institutions rise to the top.<sup>4</sup>

If there were a direct correlation between the international circulation of scientific work and its quality, only inequality of treatment would be at issue. But there is considerable anecdotal evidence that work meriting international circulation is in fact being produced, especially in countries with languages sufficiently widely spoken to sustain it and sufficiently different from English to make English hard to master (notably China and Japan: see Durand 2001:74-75, and, for a somewhat different view, La Madeleine 2007). So the monolingualism widely encountered among scientists, especially those from the USA, does carry inherent disadvantages (they may remain ignorant of significant developments in many fields), even if the disadvantages are outweighed by the advantages.

David Graddol has recently warned (2006) that the biggest threat facing British scientists is a growing unwillingness to master other languages. English is rapidly becoming a language of second-language speakers: it may even have dropped to fourth position in the world in the number of native speakers, while the number of non-native speakers is continuing to grow rapidly (Graddol 1997, 2006). Not only does this mean that on a worldwide scale control of the English language is slipping out of the hands (or mouths) of its native speakers, but also that native English speakers are trapped in their own language even as individual multilingualism (the term used to describe speakers capable of handling several languages) is on the increase elsewhere in the world. As this happens, more and more non-English-speaking universities are offering English-language programs, thereby challenging the near-monopoly previously enjoyed by the English-speaking countries. The Erasmus program and now the Bologna Process, designed to improve mobility among institutions and now covering some 45 countries, has encouraged this development.

In scientific publication, one way of reducing the inequality between native English speakers and the rest is to insist on the use of a form of simple English in scientific communication (Ammon 2003). While theoretically possible, such simplification seems in practice to be hard to achieve. Witness the failure of the project Basic English in the years before and after World War II: native English speakers had great difficulty limiting themselves to a restricted register, and in any case Basic English, by drastically reducing vocabulary, produced a kind of semantic overload on the lexicon, leading to extreme lexical and grammatical ambiguity.

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<sup>4</sup> The Top Universities Rating has been widely criticized as resembling a beauty contest. Recently, the survey has shifted to Scopus from ESI (Essential Science Indicators) for its citations, doing so, in part, because the coverage of Scopus is wider and covers more foreign-language publications. The shift has done little to move non-English-speaking universities up the scale. See <http://www.topuniversities.com/worlduniversityrankings/>.

Another way is to insist on the use of a neutral language, much as Descartes and Newton proposed three centuries ago. Esperanto is a highly expressive and yet readily learned language, and it has many speakers; but going back to the linguistic beginning by substituting Esperanto for English seems politically and socially unlikely, even if it can be shown to be cost-effective (see Grin 2005). Perhaps a compromise has to be achieved – unless we feel that the rank unfairness of the present system is one we are content to live with.<sup>5</sup>

A third way is to set up a system of compensation (Van Parijs 2003), whereby the native speakers of English actually subsidize the non-native speakers by assisting them in learning English (rather than profiting from them) and by covering the cost of rendering their texts into acceptable written English.

As things stand at present the fundamental unfairness of the system seems surprisingly acceptable to the international community – perhaps because the non-native English-speaking actors in that community have themselves made a considerable investment in the learning and use of English and have no wish to surrender that advantage.

Perhaps the best we can do is to change the rhetoric, by making it persistently clear to native English-speakers that they do indeed possess an unfair advantage that they should set about voluntarily remedying. There are some indications that this is beginning to happen. Nothing less than a rethinking of the language policy of the international scientific community seems called for – a shift from rank profit-making to egalitarian information-sharing.

In the meantime, editors of journals, organizers of conferences, and other facilitators of scientific discourse might reconsider their own micro-version of language policy, providing technical assistance to non-native English speakers using English, urging tolerance on their audiences, encouraging language learning among the monolingual, and making a systematic effort to include non-English-language material in their bibliographies and citations.

Above all, we must avoid imagining that current language use is somehow “natural” or somehow the product of ineluctable forces of “globalization.” It is not: it results from conscious choices made by the linguistically advantaged and by the lack of any coherent countervailing policy (Hamel 2006). Developing such a policy by exploring cost-effective means of inclusion and minimizing exclusion seems essential: there is no such thing as a policy-free environment, only policies that are more fair or less fair, more explicit or less explicit.

In its recent (August 12, 2007) obituary of Moe Fishman, a grand old man of the American left, the *New York Times*, quoting the *Economist*, explained how Fishman “stumbled over the word ‘globalization’” while speaking at a protest against globalization. Fishman commenting on his linguistic fumble, remarked, “It was so much easier to say when we called it imperialism.” The point, of course, is that imperialism is the product of a clearly defined actor, the imperialist; globalization, we are asked to believe, comes as naturally as leaves to the trees. Some of us remain unconvinced of the characterization of this allegedly agent-less phenomenon called globalization (see, for example, Hamel 2006). Scientists, of all

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<sup>5</sup> On alternative approaches to overcoming language difference, see Fettes 2003. On the feasibility and desirability of Esperanto, see Piron 1994, Durand 2002:111-117.

people, should look at it skeptically and ask some hard questions about who benefits and at whose cost – and at how this inequality can be remedied.

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