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## The pharmaceuticalisation of society? A framework for analysis

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**Abstract** Drawing on insights from both medical sociology and science and technology studies this article provides a critical analysis of the nature and status of pharmaceuticalisation in terms of the following key dimensions and dynamics: (i) the redefinition or reconfiguration of health ‘problems’ as having a pharmaceutical solution; (ii) changing forms of governance; (iii) mediation; (iv) the creation of new techno-social identities and the mobilisation of patient or consumer groups around drugs; (v) the use of drugs for non-medical purposes and the creation of new consumer markets; and, finally, (vi) drug innovation and the colonisation of health futures. Pharmaceuticalisation, we argue, is therefore best viewed in terms of a number of heterogeneous socio-technical processes that operate at multiple macro-levels and micro-levels that are often only partial or incomplete. The article concludes by drawing out some broader conceptual and reflexive issues this raises as to how we might best understand pharmaceuticalisation, based on our analysis, as a framework for future sociological work in this field.

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**Keywords:** medicalisation, pharmaceuticalisation, medicines, markets, consumers, futures

### Introduction

Medicalisation is a key concept in medical sociology and has also been employed in both professional and popular discourse on medicine and society. It is not a static concept, however, and there has recently been discussion among sociologists and others about the changing engines or drivers of medicalisation (Conrad 2005, 2007), the costs of medicalisation (Conrad *et al.* 2010), the shift to a new techno-scientific era of biomedication (Clarke *et al.* 2003) and other calls to rethink or go beyond medicalisation (Rose 2007, Moynihan 2002).

One key development has been a recognition of the growing importance of the pharmaceutical industry in medicalisation. While physicians are still the gatekeepers for many drugs the role of pharmaceutical promoters is increasing by aggressively targeting the public as well as physicians (Conrad 2007). Indeed, concerns over these trends have even been voiced in a recent House of Commons Health Committee Report on the pharmaceutical industry, which clearly states that while ‘the pharmaceutical industry cannot be blamed for

creating unhealthy reliance on, and over-use of, medicines, it has certainly exacerbated it' (2005: 4).

This article provides a further contribution to these debates through a detailed consideration of the related yet distinct notion of pharmaceuticalisation. Key questions here include the following: what is pharmaceuticalisation? Is it a useful sociological concept and, if so, in what ways? How does pharmaceuticalisation differ from and relate to medicalisation? Why, moreover, is pharmaceuticalisation important to consider now? Can particular drivers and dimensions of pharmaceuticalisation be delineated and documented and what future sociological agendas does all this signal?

These are the questions we seek to address. Pharmaceuticalisation, we argue, drawing on strands of science and technology studies (STS), is most productively viewed as a complex, heterogenous socio-technical process involving a number of dimensions and dynamics. This process involves the discovery, development, commercialisation, use and governance of pharmaceutical products centred around chemistry-based technology. It is to a further elaboration of these complex issues that we turn in the main body of the article.

### **Definition, delineation and dynamics: what is pharmaceuticalisation?**

Pharmaceuticalisation is not an entirely new sociological concept. While there has been an increase in the use of the term in recent years (see, for example, Abraham 2009a, Fox and Ward 2009, Williams *et al.* 2009), there has been little sustained effort, to date, to define and delineate its sociological credentials in a fashion comparable to that of medicalisation. So what then is pharmaceuticalisation?

At its simplest, pharmaceuticalisation denotes the translation or transformation of human conditions, capabilities and capacities into opportunities for pharmaceutical intervention. These processes potentially extend far beyond the realms of the strictly medical or the medicalised (Conrad 2007) to encompass other non-medical uses for lifestyle, augmentation or enhancement purposes (amongst 'healthy' people). Relations between pharmaceuticalisation and medicalisation, as this suggests, are complex and contingent and include pharmaceuticalisation without any significant degree of medicalisation. Those taking up this term have often raised questions similar to those addressed about medicalisation and about the legitimacy of pharmaceuticalisation, thereby engaging in an element of social critique. Despite this, both medicalisation and pharmaceuticalisation should ideally be treated as value-neutral descriptive terms and may include both gains and losses to society. Furthermore, the degree or extent to which they are occurring remains open to empirical investigation on a case-by-case basis. Pharmaceuticalisation, in this respect, may be partial or incomplete.

It is useful, therefore, as already noted, to frame pharmaceuticalisation as a dynamic and complex heterogeneous socio-technical process that is part of what we might call a pharmaceutical regime. This can be understood as the networks of institutions, organisations, actors and artefacts, as well as the cognitive structures associated with the creation, production and use of new therapeutics (Goodman and Walsh 1993). Such a regime has been built around the development of pharmaceutical products since their introduction in the 19<sup>th</sup> century and is centred on the chemistry-based technology embodied in the pill. As we discuss below, one of the key dynamics of this regime is its continuing commercial, clinical and geographical expansion.

This, in turn, alerts us to both upstream (macro) level processes concerning the development, testing and regulation of pharmaceuticals and downstream (micro) processes

pertaining to the meaning and use of pharmaceuticals in medical practice and everyday life. As with medicalisation, pharmaceuticalisation is potentially at least a bidirectional process in which de-pharmaceuticalisation remains possible, though in practice, even in cases of drug withdrawal, it is more likely to be a matter of one type of drug or generation of drugs replacing another or a decline in usage rather than the complete phasing out of such interventions altogether, particularly if de-medicalisation does not occur as well. The history of pharmaceutical drug development, indeed, is one in which new drugs are often designed to offset the adverse effects of previous ones. Furthermore, we can identify social resistance to the process of pharmaceuticalisation as medicine use encroaches ever further, as well as its advocacy by patients and clinicians in completely new areas.

Pharmaceuticalisation therefore is a multidimensional, multi-level concept that lends itself to a variety of different perspectives. It is to a fuller explication of these dimensions and dynamics of pharmaceuticalisation that we now turn. In doing so, we wish to focus on recent changes in the pharmaceutical regime that are making the use of drugs more expansive or pervasive, despite limited scientific evidence and a decline in pharmaceutical innovation regarding any genuine or significant therapeutic advances. What Busfield (2010) dubs the progressive or scientific account of this expansion, in other words, the account based on professional or pharmaceutical industry appeals to advances in pharmacology, scientific progress and benefits to patient or public health, is of limited explanatory value here, as she convincingly shows. At the same time we hope to demonstrate not simply the value of pharmaceuticalisation as a social scientific concept and the light that different theoretical perspectives shed on these processes but the reasons why pharmaceuticalisation is becoming increasingly important. Such a framework, we argue, can then be used to establish criteria for measuring the extent of pharmaceuticalisation in any given case.

## **Trends and transformations**

There are at least six key sociological dimensions to explore concerning trends and transformations in the pharmaceuticalisation of society.

### *Selling sickness? The redefinition and reconstruction of health problems as having a pharmaceutical solution*

The first way in which an expansion of the pharmaceutical regime is visible is in the massive growth of drug markets internationally and in particular in the USA and Europe. As a consequence, pharmaceutical solutions to health problems have become much more widespread. Undoubtedly the pharmaceutical industry is one of the most profitable industries in the world with leading companies reportedly enjoying profits of 25 per cent for most of the 1990s (Law 2006). Worldwide pharmaceutical sales now amount to over US\$700 billion a year, with North American sales alone constituting around half of this market and North American and European sales amounting to three-quarters of all sales (IMS 2010). Although starting from a lower base, sales in middle-income countries such as China, India and Brazil are now increasing at a faster rate than in countries like the USA or the UK (Busfield 2010). Moreover there has been a phenomenal growth in pharmaceutical sales since the 1980s. While prescribed drug sales in the US, for example, remained fairly stable as a percentage of GDP from 1960 to 1980, they tripled between 1980 and 2000, thereby transforming what looked like a 'good' business into a 'stupendous' one (Angell 2005: 3–5). Similarly the global drugs bill increased thirty fold between 1972 and 2005 (Law 2006). Overall, though, the distribution of pharmaceutical sales across the world remains uneven – a picture which

reflects the more chronic health problems of those in affluent (ageing) societies who require long-term medication. This is supported by the types of pills which have been most regularly produced and prescribed in the West – for example statins to reduce cholesterol. Such a pattern thus underlines Busfield's (2003) contention that westernisation rather than globalisation is a more accurate description of the development of the pharmaceutical industry at present.

It is not simply, however, a case of the manufacture of drugs but the marketing, if not manufacture, of disorders for these drugs to treat. Pharmaceutical companies, as Conrad notes, 'are now marketing diseases, not just drugs' (2007: 19). Moynihan has been a particularly vocal critic on this count (Moynihan 2002, Moynihan and Henry 2006; see also Blech 2006). He contends that some forms of medicalising ordinary life may now better be described as disease mongering or selling sickness – that is, 'widening the boundaries of treatable illness in order to expand markets for products' (Moynihan 2002: 886). Pharmaceutical companies, it is claimed, are 'actively involved in sponsoring the definition of diseases and promoting them to both prescribers and consumers': a process in which the social construction of illness is being replaced by the 'corporate construction of disease' (2002: 886). This involves: (i) turning ordinary ailments into medical problems; (ii) seeing mild symptoms as serious; (iii) treating personal problems as medical; (iv) seeing risks as diseases; and (v) framing prevalence estimates to maximise potential markets (Moynihan 2002).

In support of these contentions, in recent years a range of studies has appeared on conditions ranging from erectile dysfunction (Lexchin 2006) to restless leg syndrome (Woloshin and Schwartz 2006). As with medicalisation, however, these processes may result in various forms of resistance, as Teifer's (2006) study of female sexual dysfunction suggests.

These critiques are undoubtedly important and valuable. Compared to both medicalisation and pharmaceuticalisation, however, disease mongering is clearly a value-laden rather than a value-neutral term with an in-built element of normative judgement and social critique. Both medicalisation and pharmaceuticalisation, in contrast, as noted earlier, are ideally value-neutral descriptive terms with potentially positive and negative faces that remain open to empirical investigation on a case-by-case basis. While disease mongering thus captures an important range of issues pertinent to the broader concept of pharmaceuticalisation, its analytic value is clearly restricted. Pharmaceuticalisation, on the other hand, may or may not involve elements of disease mongering on the part of the pharmaceutical industry, though often this is the case.

Another important vehicle for pharmaceutical market expansion is direct-to-consumer (DTC) advertising. To date this is limited to countries such as the USA and New Zealand, although attempts to overturn the ban, or at least to change the rules to enable pharmaceutical companies to provide more 'information' to patients, continue in Europe. This has engendered both fierce opposition and counter-claims by the European Federation of Pharmaceutical Industry Associations (Moynihan and Cassels 2005). Nonetheless, one of the great ironies of DTC advertising, as Conrad and Leiter (2004) note, is that it extends the relationship between drug companies, physicians and consumers in ways that return us to the advertising of patent medicines in the past, when drug manufacturers had a direct and independent relationship with consumers. This shift is explored further below, along with a range of other ways of marketing disorders as well as drugs, including what Angell (2005) appositely dubs 'marketing masquerading as education' and 'marketing masquerading as research'.

*Changing forms of governance: globalisation and the new role of regulatory agencies in promoting innovation*

The second important dimension of pharmaceuticalisation is manifest in the changing relationship between regulatory agencies and the pharmaceutical industry. This has three components; firstly, reforms that have reduced the regulatory hurdle and increased the dependency of regulatory agencies on industry; secondly, new policies that have increased the role of regulatory agencies in promoting drug innovation; and thirdly, the globalisation of established models of governance based on the interests of the pharmaceutical industry in the developed world.

Important sociological work on the science and politics of medicines regulation has occurred over the past two decades. Abraham (1995, 2009a, 2009b, 2010, Abraham and Davis 2005), for example, has been at the forefront of these developments through detailed empirical case studies of the regulation of medicines such as anti-inflammatories, antidepressants and sleeping tablets and comparative analyses of regulatory institutions and processes. This work has provided evidence of a corporate bias and privileged access by pharmaceutical companies to regulatory bodies such as the Food and Drug Administration (FDA) in the USA and the Medicine and Health Care Products Regulatory Agency (MHRA) in the UK. Other work in this area has focused on regulatory responsiveness to patients' demands for the accelerated approval of new drugs (Daemrich 2004) and the fragmentation of expert authority and its consequences for regulatory decision-making (Gabe and Bury 1996a). This research raises questions about the extent to which pharmaceutical regulation is failing to act in the interests of public health: a failure that is camouflaged by claims that regulators can promote the interests of the pharmaceutical industry and the interests of public health simultaneously, when they are, in fact, in conflict (Abraham 2009b: 66).

At the same time there are clear signs that the relationship between the pharmaceutical industry and state regulatory agencies is getting even closer. For example, the industry has been required to pay most of the cost of funding of regulatory agencies – a 100% funding for the MHRA since 1989, with similar trends in the EU (70% funding) and the USA (50% funding) since the mid-1990s. In return it has seen a significant reduction in the regulatory review times for new patentable drugs, which have tumbled by half in the USA since 1993, with similar dramatic falls evident in Europe (Abraham 2009b: 60). Furthermore, new measures, such as fast-tracking approval of drugs for 'serious' or 'life-threatening' conditions with less data than would normally be expected to demonstrate safety or efficacy has resulted in around 14 per cent of new drugs receiving such approval over the last 15 years in the EU (Garattini and Bertele 2001). While reductions in review times may be in the interests of patients who need these drugs as soon as possible, the upshot of these changes, as Abraham (2009b) rightly stresses, is that they leave regulatory agencies vulnerable to the pressures of the market. In effect, these agencies are encouraged to compete with each other by making themselves attractive to drug companies who have come to be defined, in keeping with neoliberal ideology, as the regulator's 'customers'. Having said this, it is important to recognise that the pharmaceutical industry broadly supports the existing regulatory regime despite the high cost associated with compliance. This is for a number of reasons, including the consumer confidence that is associated with a rigorous regulatory regime and the high barrier to market entry this poses for new entrants.

In recent years a number of the major international drug regulatory agencies, including the FDA and the European Medicines Evaluation Agency, have started to play an increasing role in supporting pharmaceutical innovation. New activities such as the FDA's critical path initiative explore how new forms of regulatory science and technology used in the drug



approval process can be developed to streamline the route to market. This change in the role of regulators from guardians of the public health to also having a key role in promoting innovation has to be set against the background of the continuing productivity crisis in the pharmaceutical industry (Hopkins *et al.* 2007, Nightingale and Martin 2004) which sees most of the innovation coming from the small biotech companies rather than the large pharmaceutical multinationals. The latter are facing a crisis as new drugs are not being licensed fast enough to replace those whose patents have expired (Law 2006).

At the same time there has been a globalisation of the dominant western regulatory system through such initiatives as the International Conference on Harmonisation, which brings together regulators from Europe, Japan and the USA with the aim of creating greater harmonisation in the interpretation and application of regulatory guidelines for drug development and approval. There are two main drivers of this expansion of the western regulatory model: (i) the opening-up of new markets for global pharmaceutical companies to sell their products in emerging economies, such as India; and (ii) the outsourcing of important aspects of the drug development process to developing countries where the costs of clinical trials are much lower. However, this is not a simple repeat of the drug dumping in the 1970s and 1980s, as minimum standards of clinical care and safety are now required to enable the data collected in non-western clinical trials to be useful for drug approvals in North America and Europe. This shift to testing new drugs in developing countries has also been accompanied by the globalisation of manufacturing and, to a lesser extent, the process of drug discovery itself through investment in new research facilities in countries like China (Kuemmerle 1999).

*Mediation: the (re)framing of health problems in the media and popular culture as having a pharmaceutical solution*

Everything these days, it seems, is mediated one way or another. In particular, as the earlier discussion of disease mongering suggests, media involvement, witting or unwitting, facilitates processes of pharmaceuticalisation. Wooloshin and Schwartz (2006), for example, in their study of news coverage of restless leg syndrome, suggest the media have been co-opted into disease mongering about this condition given stories that: (i) exaggerated the prevalence of the disease and the need for treatment (with drugs such as ropinirole); and (ii) failed to consider the problem of over-diagnosis (2006: e170).

Kroll-Smith (2003), too, in a provocative article on the social construction of sleepiness in popular culture, points to the critical role the media now play in processes of medicalisation and, by extension, pharmaceuticalisation: extra-institutional, textually mediated forms of authority are cast in the rhetoric of medicine yet are far removed from the traditional doctor–patient relationship.

To the extent, then, that the media, directly or indirectly, are complicit in these processes of disease mongering and in so far as framing problems in this way promotes pharmaceutical interests, mediation of this kind is clearly important in relation to pharmaceuticalisation. The media, however, are not so much creators or catalysts as conveyors and amplifiers of these processes over time; the drivers of which lie elsewhere. Perhaps the clearest example of this is DTC advertising where the media become effectively a marketing tool in the service of pharmaceutical interests, alongside other forms of marketing masquerading as education, information or research (Angell 2005). These techniques include the voices of both experts and patients, as well as celebrity endorsements and offers of symptom based self-testing. This, in turn, provides diagnostic validity to the condition in question and the proposed pharmaceutical solution on offer – albeit with the proviso, ‘Ask your doctor if [drug x] is right for you’. It also creates the impression that this is a condition that could happen to

anyone (Conrad 2007: 18), thereby ensuring fertile ground for potential market expansion of the kind discussed earlier.

Moreover, as Martin (2006) notes, drugs are imbued with personalities or thought of as person-like, as a key marketing tool alongside tablet or capsule design, and educational materials, all of which are designed to connect with the potential consumer via television or the printed media. The overwhelming emphasis, especially with psycho-pharmaceuticals, is on whether they 'can make the consumer a better person, an enhanced person, or ... more like the person they really are without the interference of mental disorder, (Martin 2006: 276, see also Rose 2007).

The media, nonetheless, are no mere puppets of pharmaceutical interests. Media coverage of pharmaceuticals may be contradictory or condemnatory, oscillating between oppositional extremes of both idealisation on the one hand, and demonisation on the other (Seale 2002). A temporal pattern may be discerned here, with early media coverage of new drugs such as Prozac and Viagra being largely uncritical if not celebratory in tone and content. If or when unwelcome side effects become apparent, however, or misuse of some kind (by doctors, patients or consumers) is detected, then negative or critical portrayals soon follow. This is clearly demonstrated by the changing media coverage of benzodiazepines over time (Gabe and Bury 1996b). Rarely, it seems, do the media present a balanced portrayal of the risks and benefits contained in a single substance (Seale 2002: 148): doubtless as a product, in part, of the imperative for newsworthy stories.

Clearly then, evidence can be found in which the media both promote and challenge pharmaceutical products and interests. This, moreover, includes critical stories or media exposés about the interests and activities of drug companies, which raise questions of neoliberal corporate bias (see above) and disease mongering (see above).

Other so-called new media are also important to consider here, not simply in terms of access to pharmaceutical information or support via the Web, but in terms of the purchase of pharmaceutical products online, thereby effectively bypassing the traditional doctor–patient relationship. Fox and Ward (2009), for example, in their study of the pharmaceuticalisation of daily life, identify two broad processes at work. These are: first, a domestication of pharmaceutical consumption through computer-mediated access and consumption in the home, particularly in the bedroom (e.g. Viagra and Cialis for sexual potency) and the kitchen (for example, Xenical, Alli and Apidex for weight loss); and second, the pharmaceuticalisation of everyday life, as pharmaceuticals are treated as magic bullets for a range of day-to-day life problems. As with other media, however, these processes are far from straightforward. Indeed, the internet may provide both new channels for the pharmaceuticalisation of daily life (Fox *et al.* 2005a) and new spaces or forums for challenging or reworking prevailing understandings and practices. This is clearly demonstrated in the case of pro-anorexia websites (Fox *et al.* 2005b).

In all these diverse ways, then, we can speak of the mediation of pharmaceuticals in which the media fills both celebratory and critical roles in the process of pharmaceuticalisation. The internet, in particular, may represent a new forum for resistance of various kinds but we should not underestimate the extent to which this supposedly democratic new digital medium simply reproduces existing power relations and opportunities for the medicalisation and pharmaceuticalisation of everyday life.

*Patients, consumers and the life world: the creation of new social identities and the mobilisation of patient or consumer groups around drugs*

It is one thing to map these macro-level processes to do with the regulation of medicines and related questions of market expansion and mediation but this of course gives rise to further

important questions about the role of patients or consumers in these processes of (de-) pharmaceuticalisation. Much has been written in recent years about the increasingly active, if not critical, role patients and consumers play in their own healthcare. Previous sociological work on the meaning and use of medicines (for example, Gabe and Lipshitz-Phillips 1984, Williams and Calnan 1996) has been joined by a variety of other recent work in which attention has increasingly focused on users of pharmaceuticals as knowledgeable reflexive actors, assessing risks and benefits and making informed choices about their treatment (Stevenson *et al.* 2002, 2009). These developments, in turn, are reflected and reinforced through current health policies in both the USA and the UK that construct patients as experts, particularly the chronically ill, working in partnership with healthcare professionals (Taylor and Bury 2007). Furthermore, there have been attempts to reclassify some prescription-only medicines as over-the-counter (OTC) (House of Commons 2005), and policies to make the arrangements for the prescribing and supplying of medicines more flexible, including delimited prescribing by nurses and pharmacists (Weiss and Sutton 2009). And these in turn chime with broader trends towards a knowledge-based society in which health-related information and products are readily available on-line at the click of a mouse (Nettleton *et al.* 2005).

On the one hand the rise of the articulate or information rich consumer, and associated forms of patient expertise, suggest the potential for various challenges or forms of *resistance* to pharmaceuticalisation. On the other hand, however, these developments may themselves fuel or facilitate *further* processes of pharmaceuticalisation, including patient-driven demand for pharmaceuticals (of which more in the next section of this article), with or without the aid of DTC advertising and other forms of 'marketing' on the part of the pharmaceutical industry. Certainly there is evidence, as we have already seen, of new forms of pharmaceutical consumption through computer-mediated access which effectively bypass traditional patient-professional relations and existing forms of governance (Fox and Ward 2009, Fox *et al.* 2007, Seale 2005). This in turn suggests that consumerism is an important driver of pharmaceuticalisation, with or without the aid of professional input or industry influence.

As with all other areas of consumerism in health care, however, professional expertise of various kinds is still valued in people's decision-making regarding medicines, even in cases of OTC products – see for example Stevenson *et al.*'s (2009) recent study of consumer engagement with pharmacists regarding OTC medicines. In keeping with medicalisation therefore, these processes of pharmaceuticalisation, including the recourse to pharmaceutical expertise, amount to what, in Habermasian terms, may be viewed as the 'colonisation of the life world' (see, for example, Scambler 2006).

Related questions arise regarding not simply the implications of these processes for individual subjectivity or selfhood (cf. Rose 2007) but the multiple ways in which patients and consumers of medicines act collectively to represent their interests as members of self-help groups, patient advocacy organisations or health social movements in the public sphere (Brown *et al.* 2004, Gibbon and Novas 2008, Kelleher 2004). These issues are further complicated when some of these groups, with pharmaceutical company support, press for early access to as yet unlicensed medicines while others demand that pharmaceutical companies remove what they claim to be unsafe drugs from the market. Overall, the apparent power of patient activism or collective consumer mobilisation may therefore 'significantly depend on whether it is supporting or contravening the fundamental interests of the pharmaceutical industry' (Abraham 2009a: 113). This may go some way to explaining the apparent meagre success of citizen activism in battles against pharmaceutical companies over drug injury to patients, compared with the success of patient groups seeking access to drugs



in alliance with pharmaceutical manufacturers (Abraham 2009a). The latter includes recent high-profile cases, attracting considerable media attention, of demands to obtain new drugs on the National Health Service for breast cancer (Herceptin), multiple sclerosis (Beta Interferon) and (early onset) Alzheimer's disease (Aricept).

Whether or not such success amounts to the industry 'capture' of consumer groups' agendas is a subject of ongoing debate. Jones (2009), for example, in her recent research on health consumer groups and the pharmaceutical industry in the UK, finds little to confirm the notion of industry capture. Further questions also arise here, however, regarding pharmaceutical companies' attempts to educate or inform patients and consumers and their convergence with expert patient agendas. 'Expert patient' discourses have proved particularly useful in various pharmaceutical campaigns on this front, both in countries where DTC advertising is permitted and in others, as in Europe, where it is not. Appeals to expert patients serve a dual purpose: legitimising pharmaceutical education campaigns on the one hand, while challenging the ban on DTC advertising by characterising patients as informed consumers about drugs on the other hand. Viewed in this more critical light the industry, it appears, wishes to 'use patients as a means of de-regulation and market expansion, without regard to wider health interests' (Abraham 2009a: 114).

It therefore appears that trends toward consumerism in healthcare and associated developments such as the expert patient programme, in the main are congruent with, rather than a challenge to, the interests of the pharmaceutical industry. Indeed, patients and consumers may actively and willingly collaborate in processes of pharmaceuticalisation, particularly when much needed treatments are sought. Any increase in the critical reflexivity and expertise of consumers, moreover, needs setting in the context of a 'medical association–industry–government complex', which as Abraham contends, is 'in the interests of the pharmaceutical industry, and at the expense of consumer/patient interests' (2009a: 112, Abraham and Lewis 2002). While patient or consumer challenges are still possible, and while industry capture of consumer group agendas remains a topic of ongoing debate, the power and influence of the pharmaceutical industry is clearly extensive and should not be underestimated.

*From treatment to enhancement? The use of drugs for non-medical purposes and the creation of new consumer markets*

These discussions of consumerism in turn mesh with another important set of developments regarding the pharmaceuticalisation of everyday life in the guise of drugs for enhancement purposes among healthy people. The desire to improve ourselves in one way or another, of course, is as old as human history. What has changed, however, are the means of doing so, including the use of pharmaceuticals. Enhancement itself, however, remains a contested term, not least because it is frequently employed to denote going beyond treatment or health to become 'better than well' (Elliot 2003): distinctions which themselves are socially constructed and changeable over time. What constitutes a disease or disorder worthy of treatment and where to draw the line between these forms of therapy and other forms of enhancement amongst healthy people is no simple matter.

Conrad (2007), for example, usefully refers to three main types of biomedical enhancement: firstly, normalisation, where biomedical enhancements are used to bring the body in line with what doctors or patients deem to be normal or with socially expected standards; secondly, repair, in which biomedical interventions are used to restore or rejuvenate the body to its previous condition; and thirdly, augmentation, in order to improve or boost life performance in ways that confer the user with a competitive edge (2007: 87–9). Context, of course, is also important to consider in the sense that the very notion of

enhancement inheres 'not in the biomedical composition of the intervention, but in when and how it is used' (Conrad 2007: 89). Enhancement, moreover, represents a social temptation in a culture that values 'bigger, faster and more' and where competitive difference amongst otherwise similar individuals offers personal advantage and social rewards for those who have 'an edge' (Conrad 2007: 89).

These issues are particularly important for our purposes, as they shed further valuable light on both the drivers and dynamics of pharmaceuticalisation and its relationship to medicalisation. Not all forms of enhancement are for non-medical purposes, as the forgoing discussion of enhancement as normalisation or repair indicates. The medical profession, moreover, is now involved in many forms of enhancement, including cosmetic surgery and the use of some prescribed medicines (such as human growth hormone) for enhancement purposes. Pharmaceuticalisation nonetheless may occur in the absence of any significant degree of medicalisation, or medical involvement, as in the case, for example, of the non-medical use of pharmaceuticals amongst healthy people for enhancement purposes.

One issue attracting considerable attention on this count at the moment is the promise of a new era of cognitive enhancement drugs designed to boost alertness, concentration, memory and other aspects of cognitive functioning. A flurry of recent reports and articles has emerged in response to these developments, in which the ethical, legal and social implications of cognitive enhancement drugs and the degree to which they should be regulated loom large (Academy of Medical Sciences 2008, British Medical Association 2007, Office of Science and Technology 2005). Consider, for example, a recent controversial commentary, provocatively entitled 'Toward responsible use of cognitive enhancing drugs by the healthy', which appeared in *Nature* (Greely *et al.* 2008). Many drugs used to treat psychiatric and neurological conditions such as methylphenidate (attention deficit hyperactivity disorder), Ritalin and Aricept (Alzheimer's) and modafinil (narcolepsy), it is noted, also improve cognitive performance amongst the healthy and are being re-marketed for this purpose, particular on 'university campuses around the world' (Greely 2008: 702). Cognitive enhancement, these authors state, has 'much to offer individuals and society', including extending work productivity and delaying normal and pathological age-related cognitive decline. A 'proper societal response', therefore, they conclude 'will involve making enhancements available while managing their risks' (2008: 702).

Given neither the medical nor the social risks of such cognitively enhanced futures are understood at present, caution is indeed needed here when evaluating the use of such drugs amongst healthy people (Williams and Martin 2008). Critically, attempts to reconstruct the use of medicines as enhancement can be understood as another example of the move to create new drug markets through direct relationships with consumers that lie outside the control of the medical profession. The prospect of cognitive enhancement, therefore, clearly demonstrates both the potential of consumerism to drive these processes of pharmaceuticalisation and the ways in which any such pharmaceuticalisation may take us beyond medicalisation.

### *Pharmaceutical futures in the making: drug innovation and the colonisation of health futures*

Our sixth and final set of issues concerns questions of innovation, imagination and the making of pharmaceutical futures. Recent work in the sociology of expectations has drawn attention to the key role of the future in shaping the present. In particular, it highlights the dynamic role that expectations play in attracting support and investors and building mutually binding obligations or communities of hope or promise (Brown 2003, van Lente 1993). It also shows how these expectations differ between various groups or stakeholders

(such as scientists, the industry, consumers, policy communities, patients and publics), and how the futures envisaged are contingent, contested and fought over (Brown and Michael 2003, Hedgecoe and Martin 2003). In the process this work emphasises the considerable hope that patients, both individually and collectively, invest in future pharmaceutical breakthroughs in the treatment of their conditions (Novas 2006).

Take, for instance, the field of pharmacogenetics and pharmacogenomics (that is, the use of genetic or genomic knowledge to predict drug reactions). This field has engendered much speculation about a new era of personalised or tailor-made medicine with prevention and treatment geared to an individual's genetic profile. This, in turn, holds the promise of greatly reducing adverse drug reactions that are commonly associated with current one-size fits all interventions. In addition, by targeting drugs at particular genotypes it is argued that the effectiveness of treatment will be enhanced.

Such pharmaceutical innovation also forms the basis for much policy planning and the imagining of future healthcare scenarios (Department of Health 2003). In this way pharmacogenetics can be thought of as colonising the future and crowding out other alternative paths for development. This pharmaceuticalisation of the future may help to maintain the hegemony of a dominant biomedical discourse that constructs investment and innovation in the search for new medicines as the best way of improving human health. However, the reality of how new pharmaceutical technologies are translated into practice is rather more complex.

Certainly, pharmacogenetic data of the kind described above is now feeding into all stages of the research and development process (Webster *et al.* 2004). At present, however, progress remains slow and uneven and there appears to be little evidence of widespread benefits of the kind envisaged by these expectations (Hopkins *et al.* 2007: 8). At the same time these developments have generated a range of concerns from diverse constituencies, including potential worries about over-segmented (that is, unprofitable) markets, the proliferation of genetic testing and the racial politics they stimulate (Hedgecoe 2004, Hedgecoe and Martin 2003). Even the very notion of personalised medicine is something of a misnomer (that is, it is neither especially personalised nor tailor-made). It is also important to bear in mind that the clinical acceptability and utility of genomic-based therapies has to be placed in the context of particular regimes of treatment and practice. For example, Barr and Rose (2009) found in their study of the pharmacogenomics of antidepressant medications that there was considerable ambivalence regarding the use of antidepressant medication amongst patients with depression and a commonplace tendency to conflate a pharmacogenomic test for antidepressant medication with a genetic test for depression.

Furthermore, despite much talk of a medicinal biotechnology revolution, in which pharmaceutical innovation looms large, evidence drawn from a variety of empirical indicators highlights a major productivity crisis in the industry (Hopkins *et al.* 2007, Nightingale and Martin 2004). Despite the rise in potential drug targets flowing from genomics, a very significant increase in research and development expenditure since the 1970s, and the aforementioned neoliberal acceleration of regulatory approval times over the past 20 years, pharmaceutical innovation has actually been static or declining world wide over the past two decades (as measured by the number of new chemical entities approved in a given year, or the number of new patented drug compounds launched on the world market) (Hopkins *et al.* 2007, Law 2006). This is not to say that biotechnology will not deliver on these counts in the future. However, rather than producing revolutionary changes, medicinal biotechnology appears to be following a well-established path of slow, incremental technological diffusion (Nightingale and Martin 2004). Caution, at the very least, is therefore

needed with respect to the pharmaceutical present if not to pharmaceutical futures in the making.

Viewed in this light, then, one may perhaps be forgiven for asking why the belief in the biotechnology revolution remains so influential. Expectations, in part at least, provide the answer. They are critical to the very processes of technological change, successful or otherwise. Or, to put it more strongly, the claims underpinning the biotechnology revolution may best be viewed as 'rhetorical devices employed to generate the necessary political, social and financial capital to allow perceived promise to emerge' (Hopkins *et al.* 2007: 21). Sociologists and other social scientists studying these processes, moreover, are far from innocent bystanders. Indeed, one of the reflexive messages the sociology of expectations teaches us is the need to examine our own expectations and their role in the very co-production of the field in question, including the various pharmaceutical futures we profess to analyse.

## Discussion

Where then, returning to the questions posed at the beginning of this article, does this leave us? What is pharmaceuticalisation? Is it a useful sociological term? Why is it important to consider it now? And what remains to be done in terms of future sociological research agendas?

Pharmaceuticalisation, we have argued, can be understood as a dynamic and complex heterogeneous socio-technical process that is part of the long-term and ongoing construction of the pharmaceutical regime, including distinct socioeconomic activities and diverse actors such as clinicians, patients or consumers and regulators. These activities contribute to the overall dynamics of pharmaceuticalisation and are part of the ongoing process of the pharmaceutical industry, extending its power and reach. The extent of pharmaceuticalisation will therefore vary from case to case and depends on the context and the interplay between particular sets of actors in any one case.

Six key sociological dimensions of pharmaceuticalisation have been identified as a framework for analysis, namely: (i) the redefinition or reconfiguration of health problems as having a pharmaceutical solution; (ii) the changing relationship between state regulatory agencies and the pharmaceutical industry; (iii) the mediation of pharmaceuticals in popular culture and daily life; (iv) the creation of new techno-social identities and the mobilisation of patient or consumer groups around drugs; (v) the use of drugs for non-medical (enhancement) purposes and the creation of new consumer markets, and finally; (vi) drug innovation and the colonisation of health futures, albeit in an industry plagued by a major crisis over productivity and innovation.

Looking over these sociological dimensions of pharmaceuticalisation a number of common features are apparent, notably: a) the expansion of drug markets outside traditional areas, including new medical indications and conditions, new territories in developing countries and new applications in healthy individuals; b) the increasing dominance of state regulatory and public health agendas; c) increasing moves to bypass the dominance of the medical profession through reconstructing the role of patients and consumers and creating more direct relationships with these groups; and d) the colonisation of the life world, everyday life and health futures by pharmaceutical solutions. We suggest that, taken together, these are important recent changes that provide a comprehensive picture of pharmaceuticalisation that is distinct from medicalisation in important respects and of particular relevance to contemporary developments. These changes can be thought of as an

important shift in the types both of markets and applications targeted by the pharmaceutical industry and a transformation in the socio-technical relationships between key actor groups, with industry increasingly dominating regulatory agencies, bypassing medical control and reconstructing the role of patients and consumers. This highlights the analytic value of pharmaceuticalisation as a specific sociological concept that is of increasing relevance. In particular, it is valuable in drawing attention to the work of the pharmaceutical industry as one of the key actors in contemporary biomedicine, providing an analytical framework for empirical and theoretical research and helping to prompt a shift in the gaze of medical sociology.

It would be wrong, however, to overstate the speed or scope of pharmaceuticalisation. As mentioned in the introduction, the expansion of the pharmaceutical industry and its products and markets has been happening for over a century, although this has arguably intensified in the last few decades. Furthermore, as we have stressed, the complex relationship between the industry, the state and the medical profession places real structural limits on the extent to which drug companies can operate outside the control of either government or medicine, as both provide vital sources of legitimation. State sanction through the regulatory process plays a key role in both regulating market entry and ensuring consumer confidence, while the medical profession's role as gatekeeper is rooted in mediating the sick role and regulating people's access to healthcare. Finally, there are important sources of resistance to the expansion of pharmaceutical markets from the media, government, medicine, patients and diverse publics thereby making de-pharmaceuticalisation a possibility in principle, if infrequent in practice.

We conclude, however, in a more reflexive vein concerning both these sociological engagements with pharmaceuticalisation and our own role in them. To the extent that sociologists have sought to engage with these matters to date, with or without explicit reference to the notion of pharmaceuticalisation, they have clearly done so from a variety of different theoretical perspectives, including political economy or realist approaches, elements of both strong or weak social constructionism, various strands of scholarship in STS and other, more avowedly Foucauldian and Habermasian concerns with questions of governance and colonisation, respectively.

It is not our intention in this particular article to arbitrate or adjudicate these matters or to provide some sort of grand theoretical synthesis. To do so may well be premature, if not unnecessary, at this particular juncture. To the extent, moreover, that pharmaceuticalisation is a multi-level and multidimensional concept, there is strength or merit in this theoretical eclecticism. Keeping our theoretical options open, in other words, may well be wise at this point. There are also significant opportunities here, through concepts linked to multi-level and multiple dimensions, such as pharmaceuticalisation, to foster further fruitful links between ongoing work in medical sociology and STS on these matters.

Future research agendas might, therefore, consider a number of key issues, including studies of the role of industry in expanding pharmaceutical markets to cover new diseases, disorders and other non-medical conditions, the changing role of regulatory authorities, the reconstruction of the role of patients and consumers in the development and use of drugs and the way in which the life world, everyday life and health futures are being colonised by pharmaceutical solutions. In doing so, sociologists must also be reflexive about their own role in the creation or, to borrow a much favoured term from STS, the co-production of these very matters concerning both the pharmaceuticalisation of society to date and the contested or colonised futures to which they speak.



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## References

- Abraham, J. (2009a) The pharmaceutical industry, the state and the NHS. In Gabe, J. and Calnan, M. (eds) *The New Sociology of the Health Service*. London: Routledge.
- Abraham, J. (2009b) Sociology of pharmaceuticals development and regulation: a realist empirical research programme. In Williams, S.J., Gabe, J. and Davis, P. (eds) *Pharmaceuticals and Society: Critical Discourses and Debates*. Oxford: Blackwell.
- Abraham, J. (2010) On the prohibition of conflicts of interest in pharmaceutical regulation: precautionary limits and permissive challenges. A commentary on Sismondo and O'Donovan and Lexchin, *Social Science and Medicine*, 70, 648–51.
- Abraham, J. and Davis, C. (2005) Risking public safety: experts, the medical profession and 'acceptable' drug injury, *Health, Risk and Society*, 7, 379–95.
- Abraham, J. and Lewis, G. (2002) Citizenship, medical expertise and the regulatory state in Europe, *Sociology*, 36, 67–88.
- Abraham, J.W. (1995) *Science, Politics and the Pharmaceutical Industry*. London: University College London Press.
- Academy of Medical Sciences (2008) *Brain Science, Addictions and Drugs*. London: AMS.
- Angell, M. (2005) *The Truth about Drug Companies*. New York: Random House.
- Barr, M. and Rose, D. (2009) The great ambivalence; factors likely to affect service user and public acceptability of the pharmacogenomics of antidepressant medication. In Williams, S.J., Gabe, J. and Davis, P. (eds) *Pharmaceuticals and Society: Critical Discourses and Debates*. Oxford: Blackwell.
- Blech, J. (2006) *Inventing Diseases and Pushing Pills*. London: Routledge.
- British Medical Association (2007) *Boosting Your Brain Power: Ethical Aspects of Cognitive Enhancements*. London: BMA.
- Brown, N. (2003) Hope against hype: accountability in biopasts, presents and futures, *Science Studies*, 16, 3–2.
- Brown, N. and Michael, M. (2003) A sociology of expectations: retrospectively prospecting and prospecting retrospects, *Technology Assessment and Strategic Management*, 15, 3–18.
- Brown, P., Zavestoski, S., McCormick, S., Mayer, B., et al. (2004) Embodied health movements: new approaches to social movements in health, *Sociology of Health and Illness*, 26, 1, 50–80.
- Busfield, J. (2003) Globalization and the pharmaceutical industry revisited, *International Journal of Health Services*, 33, 581–603.
- Busfield, J. (2010) 'A pill for every ill': explaining the expansion in medicine use, *Social Science and Medicine*, 70, 931–41.
- Clarke, A., Fishman, J., Fosket, J.R., Mamo, L. and Shim, J. (2003) Biomedicalization: technoscientific transformations of health, illness and US biomedicine, *American Sociological Review*, 68, 161–94.
- Conrad, P. (2005) The shifting engines of medicalization, *Journal of Health and Social Behavior*, 46, 3–14.
- Conrad, P. (2007) *The Medicalisation of Society*. Baltimore: Johns Hopkins University Press
- Conrad, P. and Leiter, V. (2004) Medicalization, markets and consumers, *Journal of Health and Social Behavior*, 45, 158–76.
- Conrad, P. and Leiter, V. (2009) From Lydia Pinkham to Queen Levitra: direct-to-consumer advertising and medicalization. In Williams, S.J., Gabe, J. and Davis, P. (eds) *Pharmaceuticals and Society: Critical Discourses and Debates*. Oxford: Blackwell.

- Conrad, P., Mackie, T. and Mehrota, A. (2010) The costs of medicalization, *Social Science and Medicine*, 70, 1943–47.
- Daemmrich, A. (2004) *Pharmacopolitics*. Chapel Hill: University of North Carolina.
- Department of Health (2003) *Our Inheritance, Our Future: Realising the Potential of Genetics in the NHS*. UK Government White Paper. London: Department of Health.
- Elliot, C. (2003) *Better Than Well: American Medicine Meets the American Dream*. New York: W.W. Norton.
- Fox, N.J. and Ward, K.J. (2009) Pharma in the bedroom ... and the kitchen. The pharmaceuticalisation of daily life. In Williams, S.J., Gabe, J. and Davis, P. (eds) *Pharmaceuticals and Society: Critical Discourses and Debates*. Oxford: Blackwell.
- Fox, N.J., Ward, K.J. and O'Rourke, A.J. (2005a) The 'expert patient': empowerment or medical dominance? The case of weight loss, pharmaceutical drugs and the internet, *Social Science and Medicine*, 60, 1299–309.
- Fox, N.J., Ward, K.J. and O'Rourke, A.J. (2005b) Pro-anorexia, weight-loss drugs and the internet: an 'anti-recovery' explanatory model of anorexia, *Sociology of Health and Illness*, 27, 7, 944–71.
- Fox, N.J., Ward, K.J. and O'Rourke, A.J. (2007) A sociology of technology governance for the information age: the case of pharmaceuticals, consumer advertising and the internet, *Sociology*, 40, 315–34.
- Gabe, J. and Bury, M. (1996a) Halcyon nights: a sociological account of a medical controversy, *Sociology*, 30, 447–69.
- Gabe, J. and Bury, M. (1996b) Risking tranquilliser use: cultural and lay dimensions. In Williams, S. and Calnan, M. (eds) *Modern Medicine*. London: University College London Press.
- Gabe, J. and Lipshitz-Phillips, S. (1984) Tranquillisers as social control? *Sociological Review*, 32, 524–46.
- Garattini, S. and Bertele, V. (2001) Adjusting Europe's drug regulation to public health needs, *The Lancet*, 358, 66.
- Gibbon, S. and Novas, C. (eds) *Biosocialities, Genetics and the Social Sciences*. London: Routledge.
- Goodman, J. and Walsh, V. (1993) Little and Big Heuristics: medicine, chemistry and pharmaceutical production in nineteenth-century Europe. Paper given at Society for the History of Technology (SHOT), Conference on Technological Change, Oxford, 8–11 September 1993.
- Greely, H., Sahakian, B., Harris, J., Kessler, R.C., *et al.* (2008) Towards responsible use of cognitive-enhancing drugs by the healthy, *Nature*, 456, 702–5.
- Hedgecoe, A. (2004) *The Politics of Personalised Medicine*. Cambridge: Cambridge University Press.
- Hedgecoe, A. and Martin, P. (2003) The drugs don't work: expectations and the shaping of pharmacogenetics, *Social Studies of Science*, 33, 327–64.
- Hopkins, M.H., Martin, P.A., Nightingale, P., Kraft, A., *et al.* (2007) The myth of the biotech revolution: an assessment of technological, clinical and organisational change, *Research Policy*, 36, 566–89.
- House of Commons Health Committee (2005) *The Influence of the Pharmaceutical Industry* (Fourth Report for Session 2004–5). London: Stationery Office.
- IMS Heath (2010) *Press releases: IMS health forecasts*. Available at <http://www.imshealth.com/portal/site/imshealth> (last accessed 6 December 2010).
- Jones, K. (2009) In whose interest? Relationships between health consumer groups and the pharmaceutical industry in the UK. In Williams, S.J., Gabe, J. and Davis, P. (eds) *Pharmaceuticals and Society: Critical Discourses and Debates*. Oxford: Blackwell.
- Kelleher, D. (2004) Self help groups and their relationship to medicine. In Kelleher, D., Gabe, J. and Williams, G. (eds) (2004) *Challenging Medicine*. 2nd edition, London: Routledge.
- Kuemmerle, W. (1999) Foreign direct investment in industrial research in the pharmaceutical and electronics industries – results from a survey of multinational firms, *Research Policy*, 28, 179–93.
- Kroll-Smith, S. (2003) Popular media and 'excessive sleepiness', *Sociology of Health and Illness*, 25, 6, 625–43.

- Law, J. (2006) *The Big Pharma*. London: Constable and Robinson.
- Lexchin, J. (2006) Bigger and better: how Pfizer redefined erectile dysfunction, *Public Library of Science Medicine*, 3, e132.
- Martin, E. (2006) The pharmaceutical person, *Biosocieties*, 1, 273–88.
- Moynihan, R. (2002) Disease-mongering: how doctors, drug companies, and insurers are making you feel sick, *British Medical Journal*, 324, 923.
- Moynihan, R. and Cassels, A. (2005) *Selling Sickness*. New York: Nation Books.
- Moynihan, R. and Henry, D. (2006) The fight against disease mongering: generating knowledge for action, *Public Library of Science Medicine*, 3e, 191.
- Nettleton, S., Burrows, R. and O'Malley, L. (2005) The mundane realities of the everyday lay use of the internet for health, and their consequences for media convergence, *Sociology of Health and Illness*, 27, 7, 972–92.
- Nightingale, P. and Martin, P.A. (2004) The myth of the biotech revolution, *Trends in Biotechnology*, 22, 564–69.
- Novas, C. (2006) The political economy of hope: patients' organizations, science and biovalue, *Biosocieties*, 1, 289–305.
- Office of Science and Technology Department of Trade and Industry (2005) *Drugs Futures 2025*. London: DTI.
- Rose, N. (2007) *The Politics of Life Itself*. Princeton: Princeton University Press.
- Scambler, G. (ed.) (2006) *Habermas, Critical Theory and Health*. London: Routledge.
- Seale, C. (2002) *Media and Health*. London: Sage.
- Seale, C. (2005) New directions for critical internet health studies, *Sociology of Health and Illness*, 27, 4, 515–40.
- Stevenson, F., Britten, N., Barry, C., Bradley, C. and Barber, N. (2002) Perceptions of legitimacy: the influence on medicine taking and prescribing, *Health*, 6, 85–104.
- Stevenson, F., Leontowitsch, M. and Duggan, C. (2009) Over-the-counter medicines: professional expertise and consumer discourses. In Williams, S.J., Gabe, J. and Davis, P. (eds) *Pharmaceuticals and Society: Critical Discourses and Debates*. Oxford: Blackwell.
- Taylor, D. and Bury, M. (2007) Chronic illness, expert patients and care transition, *Sociology of Health and Illness*, 29, 1, 27–45.
- Teifer, L. (2006) Female sexual dysfunction: a case study of disease mongering and activist resistance, *Public Library of Science –Medicine*, 3, e178.
- Van Lente, H. (1993) *Promising Technology: the Dynamics of Expectations in Technological Development*. Enschede: University of Twente.
- Webster, A., Martin, P.A., Lewis, G. and Smart, A. (2004) Integrating pharmacogenetics into society: in search of a model? *Nature Reviews Genetics*, 5, 663–69.
- Weiss, M.C. and Sutton, J. (2009) The changing nature of prescribing, *Sociology of Health and Illness*, 31, 3, 406–21.
- Williams, S.J. and Calnan, M. (eds) (1966) *Modern Medicine: Lay Perspectives and Experiences*. London: University College London Press.
- Williams, S.J. and Martin, P.A. (2008) Risks and benefits may turn out to be finely balanced, *Nature*, 457, 532.
- Williams, S.J., Seale, C., Boden, S., Lowe, P., et al. (2009) Waking up to sleepiness: modafinil, the media and the pharmaceuticalisation of everyday/night life. In Williams, S.J., Gabe, J. and Davis, P. (eds) *Pharmaceuticals and Society: Critical Discourses and Debates*. Oxford: Blackwell.
- Woloshin, S. and Schwartz, L.M. (2006) Giving legs to restless legs: a case study of how the media help make people sick, *Public Library of Science Medicine*, 3, e170–8.