



WHAT'S IN A SLOGAN?

The meanings of translational science among academic cancer researchers in an English medical school

by Alexander D. Rushforth

Translational science is currently proving a highly influential term in framing how biomedical research is promoted and evaluated in a great number of countries. Although there has been a steady trickle of scholarly literature on the topic, the performative uses of the term in practices of academic researchers has been under-researched. Drawing on interviews with members of a cancer laboratory and research institute in an English academic medical school, this paper analyzes various uses and contexts in which the slogan is deployed. The findings demonstrate the multi-dimensional uses of the term across different levels of the organization, acting at one level as a managerial function for formulating an 'impact' narrative, whilst also fulfilling researcher requirements to satisfy demands made of them in pursuing funding and positions. Analyzing how this specific slogan functions in this site evokes a wider set of considerations about the kinds of rhetoric invoked and increasingly expected of cancer scientists in academic settings.

Keywords: Translational science, Academic researchers, Cancer research, Research governance

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Introduction

One of the most visible examples of 'mission-oriented' research in the modern sciences is biomedicine (Fujimura 1996). In principle, discoveries made at the frontier of laboratory and clinical research are expected to translate into clinical applications, including new therapies, diagnostics and public health innovations (Collins et al. 2003). For obvious reasons the promise of improved health and wealth has led to significant investments of public funds in the medical research system over the course of the second half of the twentieth century and into the twenty-first century (Löwy 1996, Cambrosio et al. 2006, Harrington and Hauskeller 2014). At the same time loss of faith in the 'linear model' of innovation (Godin 2006) in academic contexts has precipitated heightening accountability towards scientific research, whereby scientists are required increasingly to specify the potential of their research.

One of the most conspicuous slogans around which accountability for biomedical research is being organized is 'translational science' (McAnaney et al. 2010, Rey-Rocha and Martín-Sempere 2012). This term refers to a series of 'gaps' identified in the assumed trajectories of biomedical research and development, including translation of new knowledge into drugs, therapies, diagnostics, and public health practices (Molas-Gallart et al. 2015). More broadly at the science policy level the term sometimes comes to connote promises with regards to how biomedical science can enhance its contributions to society in the form of clinical, civic, or commercial pay-offs (Lander and Atkinson-Grosjean 2011). In this sense the slogan bears resemblances with more general notions like strategic science (Rip 2004), triple helix (Etzkowitz 2008), Mode 2 (Nowotny, Scott, and Gibbons 2001), Academic Capitalism (Slaughter and Rhoades 2004), and 'Pasteur's Quadrant' (Stokes 1997).¹

As with each of these broader innovation narratives, translational science can be thought of as conveying demands by interested actors ('principals') for scientists ('agents') to demonstrate practical pay-offs from costly yet promising research activities (Guston 2000, Morris 2003). Despite some broad similarities, translational science can be understood as being specifically targeted towards biomedical research and the particular problems identified in the expected trajectories of its research from 'bench to bedside' (Rip 2011). Indeed investment in the promise of translational medical science is today explicitly recognised and promoted in national and regional research policy agendas throughout OECD countries. In the UK, in 2006 a series of policy reforms in public funding of health research explicitly prioritised translational science (Cooksey 2006, DH 2007), with funding agendas of intermediary organisations like the Medical Research Council and National Institute of Health Research prioritizing this focus (Kearnes and Wienroth

2011). Similarly since the early 2000s, the United States' National Institute of Health (NIH) has set out a series of 'road-maps' for moving towards prioritising translational medical science through various policy instruments, including funding schemes, career-track positions in university medical centres and reoriented evaluation criteria (Zerhouni 2005, Collins 2010).

Despite these conspicuous efforts, relatively little is known about how this discourse is reshaping work practices in academic biomedical research. As the 'agents' of medical research policy (Morris 2000, 2003), the strategic responses of researchers is of immediate relevance to this question. Based primarily on semi-structured interviews, this paper explores the rhetorical strategies and meanings deployed through the term 'translational science' among a fundamental research-oriented group located in a cancer research division in an English academic medical school. This kind of institutional setting and group is especially useful in bringing to light a wider set of issues surrounding shifting accountability relations in research universities and the reported 're-contextualisation' of knowledge production argued to be underway, particularly in medical research (Hessels and van Lente 2008, Nowotny, Scott, and Gibbons 2001).

The structure of the paper is as follows. The first section provides an overview of various strands of research literature relevant to this study and outlines the issues and debates on which this paper aims to build. The setting and methods for the study are then outlined before the findings are presented. The findings are based on emergent themes in the analysis of interviewing materials and are oriented around three 'levels' of this laboratory's organizational response to the challenge of translational science:

- (1) the broader social impact agenda which has become very visible in the UK research system in recent times (introduced below)
- (2) the control of external resources like grant money and reputation
- (3) the marketing strategies of early-career researchers.

The discussion and conclusion sections shows how each of these levels contributes important insights into the rhetorical strategies employed in response to pressures towards 'translational science', and suggests studying researcher rhetorical activities as important to better understand the shape and consequences the translational 'bandwagon' is beginning to have in academic biomedicine.

¹ For a review see Hessels and van Lente 2008



Retrieving translational science practices

A research cancer institute within an English academic medical centre presents an interesting opportunity to explore meanings being given to the term translational science. As hybrids between university medical faculties and academic hospitals, this kind of organization combines research with goals of medical care and training. Over recent decades reductions in public funding of research departments, the advent of research evaluation measures, and pressures on researchers to pursue 'external' competitive or industry-based funding, have arguably transformed organisation and production of academic sciences across many university systems including medical schools (Slaughter and Rhoades 2004). External dependence and accountability has intensified, particularly in arenas like biomedicine where huge start-up and maintenance costs make researchers resource-dependent on 'clients' like state agencies and private businesses (Ziman 2000). The goodwill of public agencies financing biomedical research has proved finite and these 'clients' have become much 'pushier' in terms of pre-specifying in the abstract outcomes of research they value. This has led to the growing importance of promises as a form of currency, particularly in markets for basic forms of research funding where 'useful' applications are neither predictable nor self-evident (Rip 2004).

The rise of the slogan 'translational science' appears to mediate the expectations of funders and stakeholders of biomedical science on the one hand and the work produced and offered by scientists on the other (Rip 2011). In the UK university system at the time of this fieldwork another set of developments overlapping with concerns for translational science was the 'impact' agenda in the country's national research assessment program, the Research Excellence Framework (REF). In the UK the quality of departmental performance in this formal assessment exercise informs allocation of state funds departments receive for research (Martin 2011). The 2014 REF (unlike its predecessor versions) introduced a 'societal impact' measure as part of its evaluation criteria (alongside measuring scholarly/scientific impact) (HEFCE n.d.). Some have argued that the strategic orientation and work organisation of biosciences in the UK since the post-war period has prepared them relatively well for the advent of such evaluation measures (Morris 2010), particularly in areas where narratives of innovation are more ready-to-hand (Samuel and Derrick 2015).

How researchers respond to these steering efforts is an important issue as it bears on the outcomes and effectiveness of science policies (Morris 2003). Scientists have long been known to adapt their language strategically according to demands of patrons and roles expected of them in society (Ben-David 1971). Science studies has provided compelling examples of prominent social and literary technologies mobilised in the organisation of scientific research (cf. Shapin and Schaffer 1985). Studies into uses and limits of other well-established slogans like basic (Calvert 2006) and strategic (Irvine and Martin 1984, Rip 2004) science also underscore

the strategic activities of scientists in responding to ongoing social, historical, and economic dynamics in the science-society 'contract'. This article picks up the baton left by these studies to explore the uses and implications of widespread use of this slogan within scientists' rhetorical strategies. The field of cancer research is particularly appropriate, as the promise of research translation has long been intimately bound up with patron investments in cancer research. In the USA, during the 1950s the status of cancer research as a finding (not just searching) science was integrated into the nascent National Institution of Health via its Cancer Cure program (Rettig 2005: 180). Likewise campaigns championing the cancer drug Interferon in the 1970s were also mobilized on the promise of its potential to cure cancer (Fujimura 1996: 76, 260). But findings here suggest the slogan of translational science – as well as reconstituting these earlier promises in partial ways – is also indicative of shifting social context in science and higher education, which now exerts particular pressures back onto the context of academic cancer researchers. This study provides a revealing opportunity to take stock of the kinds of promises and negotiations currently mobilised in medical research settings, and to reflect on how these might depart from implications of earlier promises of cancer scientists' rhetoric.

As well as providing a modest update to parts of the sociological and historical literature on cancer researchers, the study builds on more recent accounts of translational science produced at the intersection between medical sociology and science and technology studies (STS) (Coopmans, Graham, and Hamzah 2012). Here a number of important studies have flagged the importance of contributions qualitative case studies around specific clinical problems can make to reporting how translational science 'works' in sites expected or claiming to participate in such activity (Wainwright et al. 2009). These studies focus on how 'two cultures' of science and medicine come together and interact in new spaces of knowledge production (Lander and Atkinson-Grosjean 2011). Spotting strong discursive overlaps with the earlier 'linear model' of innovation, their main focus is critiquing the bench-to-bedside model for providing an over-simplified, reified, and deterministic version of biomedical innovation, far removed from practical, day-to-day struggles of enacting this promise at the 'coal-face' of knowledge sites (Martin, Brown, and Kraft 2008, Wainwright et al. 2006). Another empirical study has explored the implications of the rise of formal programs of translational science in reconfiguring power relations and funding flows between basic scientists and clinicians (Rey-Rocha and Martín-Sempere 2012).

In Spain translational science has been promoted through schemes deploying basic scientists in hospital settings with the expectation that their co-presence alongside clinical actors will help cultivate interaction at the intersection of basic and clinical research. Yet their survey signals only modest success so far in transforming



the professional culture of Spanish hospitals dominated by clinical research towards embrace of basic scientists. In the case of the UK, Wilson-Kovacs and Hauskeller (2012) report how the rise of stem cell translational science has provided a largely effective platform through which the professional legitimacy of interdisciplinary forms of research at the interface of basic and clinical research has

been reconstituted through the figure of the clinician-scientist. Building on these accounts of shifting professional and epistemic boundaries and identities, and critiques of linear theorizing, this article analyses the so far less researched site of academic fundamental research and researchers' strategic negotiations of translational science.

Setting

The cancer institute in this study was located within a medical school in a UK research university. The institute hosted a range of research groups whose focus could be broadly positioned within definitions of 'translational science' projected by key strategic policy documents (e.g. Cooksey 2006). The group was approached by way of a 'snowball' sampling technique, after the head of the institute suggested I make contact. In sum seven semi-structured interviews were conducted in 2011, ranging from forty-five minutes to one-and-a-half hours. Respondents included the Head of the institute, the principal investigator (PI) of a molecular cell biology laboratory, from the same group a senior lecturer (and principal investigator of one section of the laboratory), technician, two postdoctoral researchers, and as further background a charity engagement officer employed full-time in the institute. The response rate was modest, insofar as out of twenty-three persons employed or affiliated with the group according to the institution's website, only five came forward after emails and reminders were sent via the principle investigator. This is partly explained by the principle investigator's wish that I not interview 5 PhD students out of fear of distraction from their studies. As this population are often immersed in experimental work and are less familiar with the academic research system, their views were not considered indispensable for addressing the research questions posed in this study. For similar reasons two secretarial staff member were not approached. Once non-eligible persons were omitted, the figures I interviewed represented a cross-section of the remaining roles

within the laboratory. In addition I was able to draw on documents for background context, including publicly available project funding descriptions informants had produced, materials from the institution's website, press releases, and reading through the publications of those being interviewed via the PubMed database.

Interviews were audio-recorded and transcribed verbatim, and imported along with documentary materials into the NVivo qualitative software program. Materials were coded following procedures outlined in Ritchie and Spencer's (1994) *Framework for thematic qualitative analysis*, focussing on different social meanings attached towards translational science and its functioning within respondents' contexts of action. It became clearer during each stage of analysis that interviewees encompassed a diverse range of organisational positions, interests, and experiences in relation to translational science. Findings in the paper are structured around core themes of how different respondents in the case mobilized translational science in their respective work situations. These are separated into three work-level problems, each of which I would posit are pressures more or less recognizable to biomedical researchers in contemporary academic research. The first focuses on managerial concerns in the research institute, specifically struggles faced in responding to formal research assessments. The second considers scientists' responses towards increasing reliance on 'external' markets for research funding. The third confronts pressures effecting early-career researchers in academic employment markets.

Translational science and the impact agenda

The Head of the institute occupied the most senior research management position within the medical faculty. Within our interview the significance of translational science folded into more general concerns he had for displaying and persuading certain audiences of 'societal impact' as defined through the REF auditing exercise of 2014:

I think at the moment we're benefitting from the fact that government agencies in particular are interested in the idea of [societal] impact. That may not always be the case... but for the moment the searchlight is shining on the bit that we do best. (Head)

Each of the institute's quasi-autonomous research groups were

positioned as playing a certain role within the cancer institute's translational science portfolio and thus had to account for 'societal impact' of their work, framed either in terms of their respective expertise in basic, pre-clinical or clinical research:

For the institute more generally: we are a research-led institute, but a lot of that is around curiosity-driven research; the basic research into fundamentals of cellular and molecular processes. But each of the individual research groups is charged with developing a translational component to their work[...] Translation has now become an important driver for the assessment of impact, which will have important implications for the funding of research in the future, for better or worse. (Head)



In respect to formal evaluations, the slogan was enrolled by the institute management in configuring a particular set of authority relations, where leaders of laboratories or clinical centers had to account for how their research fit into the translational science 'portfolio' of the institute and how each group contributed to the REF submission. Despite suggestions by the Head that translational science acted as a successful slogan in framing the institute's REF strategy, efforts to satisfy this vision were of course not always seamless. The PI of the fundamentally-oriented research laboratory in this study recounted his annual appraisal meeting with the Head, in which he had been made to account for how he would align his laboratory's research output with the formal research assessment criteria. It emerged that what the PI had presented as translational and 'impact'-worthy during his appraisal meeting did not meet management's reading of REF criteria.

For one, work which had eventually been scaled up into commercial developments and clinical trials had been accomplished elsewhere, before his laboratory had moved to the current institution and was thus disqualified from the criteria. In addition the publication of review articles in prestigious scientific journals which comment on existing state-of-the-art in scientific knowledge and propose directions in which an academic field can and should move (including its clinical potential) was not able to meet research assessment 'impact' standards (as interpreted by the Head):

Then I asked [the Head] what if you write reviews in *Nature/Science* and he answered 'that's just vanity, it doesn't count'. But, you know, not everybody writes reviews in *Nature*, there are only a few people in the world who are allowed to write in *Nature*- this is influential stuff. You are setting out the directions for the field as a whole - clinical, basic, whatever - I mean this is impact-type stuff so I don't know why this would not count. (PI)

According to this account, the Head wanted tangible, instrumental examples of translation, whereas the PI was providing more pervasive (yet harder to identify) examples of conceptual impact (Pettigrew 2011). That publication in 'high impact' journals like *Nature* could be put forward as exemplifying 'translation' appears somewhat telling of disruptions between the pursuit of 'excellence' (in terms of publication outputs, impact indicators, and journal brand names) on the one hand and the push towards translational science on the other. Notions of incommensurability between 'two cultures' of basic science and clinical research (Wainwright et al.

2006) are made further visible in the Head's account:

Translational research is hard and it can be dirty. And, you know, traditionally, scientists have aimed to get their work published in *Nature* or *Science*, which have very high impact factors. But impact factor here means something very different from what I mean by impact - on the disease burden - because the change of practice that may come with the discovery of a new drug or the introduction of a new clinical procedure is never going to be published in *Nature* or *Science*. You know, it's just the reality. (Head)

Although some research groups in the institute - for instance those involved in proof-of-principle clinical studies - could presumably produce powerful narratives of 'impact', which align the Head's 'impact' definition (without changing their existing research practices), the cell biologists could not offer accounts of their activities as ready-to-hand. To some extent the basic science laboratory operated on a different evaluative register to those conducting clinical trials. Thus although introducing an accountability order around translational science, the Head acknowledged the legitimacy of existing justifications for conducting basic research in the cancer institute setting:

You've got to have something to start. You've got to have an A to get to B. If all the work is just focused on the B, i.e. the patient, you won't have anything to translate. It's important to have a balance, but I think it's important to cross-pollinate between people at both ends of the pipe; to educate, to have doctors and clinicians who are familiar with the language of science and understand at least the principles of what the fundamental research is about. But you've also got to motivate, by exposing basic scientists to the big clinical questions. (Head)

From this account it would seem then that for basic scientists, it is now crucial to demonstrate and make visible 'willingness' to interact with those outside their peer group, when being made accountable through the formal evaluation moments like REF submissions and annual appraisals. The flexibility of the term provides different social actors with a common discursive register (Gilbert and Mulkay 1984), but what 'counts' as translational science and who gets to decide in particular settings have to be negotiated locally, as well as in macro-contexts. Important here is not only how translation is defined, but who gets to define it and through what means.

Courting external resources

Social and literary technologies have for centuries been central to the functioning of science in producing new knowledge (Shapin and Schaffer 1985). Part of the skill-set required of scientists is to attract funding and sell their research ideas to those who might be willing to pay. Within the basic research

laboratory the patrons included the likes of research councils and charities. Informants in this study who actively pursued competitive funding were the PI, who was recognized by the other respondents as 'the boss', and the senior lecturer who was in charge of a section of the overall laboratory and conducted his own funded



projects with his own staff. At these levels a pertinent function of associating their work with the promise of clinical translation was in offering narratives which funding audiences would likely find attractive, 'talking up' the product in the hope of attracting funds (Knorr-Cetina 1981, 101). Indeed the translational message had to be 'tweaked' when applying for grants from certain research councils or charities, and the varying 'missions' the organizations and their programs were promoting. Thus:

Depending on what kind of project we have it may be suitable for one funding body over another. (Senior Lecturer)

Making the promise of translational science work to his advantage in pro-forma funding applications to research councils like the Medical Research Council (MRC) and Biotechnology and Biological Sciences Research Council (BBSRC) did not necessitate detailed accounts of how, when, and where translations would emerge, but necessitated inclusion of statements containing only 'scripts for potential future action' (Knorr-Cetina 1981):

I will put some forward-looking statements in there [applications], that it helps the economy, that sort of stuff, you know. I'm not saying that I'm going to cure a disease, but I am saying that 'look, based on this people might actually start to set-up a company'. But I'm not proposing to do it, you know, there is a different way of putting it. (PI)

This literary strategy can be read from the following promissory statement from an Award Statement for a grant they had (successfully) submitted. It underlines a particular commercial connotation of translational science the PI was referring to in his above quote about grant writing (protein type has been anonymized):

This is a fundamental science project that will enhance our knowledge about basic biological phenomena. In the past, the biology of [Y Protein] has impacted on science far beyond our own field, mainly because these enzymes control fundamentals of biology. *This proposal also has the potential to benefit industry, as it might identify [Y Proteins] as new targets to develop medicines against.* In the longer term, it is very likely that this research may lead to a better understanding of disease processes and *to the development of new medicines.* (BBSRC Award Statement, emphasis added)

Even though they are identified as a basic science laboratory applying for money from a 'basic' science research council (BBSRC), there is an identified requirement that they include statements predicting consequences beyond the immediate context of their discoveries. But what exactly constitutes the assumed expectations of the applicants in this setting here pertains to economic potential. Thus one level on which the slogan translational science is able to gain traction is through being 'flexible' enough to accommodate university requirements for commercial activities in research, as well as 'long term' potential for developing new medicines.

Meeting these rhetorical requirements was not identified as particularly problematic within interviews (and was skilfully performed within the project proposals I was able to obtain). Obviously such an assessment is contingent on how effectively individual informants can present themselves as scientists: in the current grammar of evaluating biomedical science (high impact publications, courting large external grants), the lab and its principle investigator appeared to have been largely successful. To some extent they understood prior successes could be used as bargaining chips to buffer pressures for 'translation' of the type promoted in the managerial priorities outlined by their faculty (for instance interacting with clinicians). Yet these sorts of pressures also courted some anxieties about 'excessive' intrusion of translational work into their routine basic research practices. For those researchers strongly focussed on pursuit of scarce resources like grant money and journal space in a highly competitive professional field, 'translational science' connotes potentially unwanted distractions. Although supporting general platitudes like a desire to move findings into clinical studies, notions that they themselves should become more strongly accountable for direct involvements with clinical researchers were resisted, wishing instead to maintain their position as a fundamental research laboratory:

I think translational work is a dangerous game because you can work with doctors, clinical fellows, but, you know, you still have to maintain your identity as a basic researcher... I cannot become a clinician, I have no aspiration to. I'm in the wrong business. (PI)

Taking up translational challenges further would require the redrawing of boundaries which they saw as indispensable for 'going on' as basic scientists in their day-to-day activities. Yet previous activities could also be retrospectively cherry-picked and repackaged as 'translational'. For example, consulting for pharmaceutical and technology companies was represented as evidence of how they facilitated translational processes elsewhere (whilst simultaneously bringing about external income to be reinvested in the laboratory). Likewise citing past findings from the laboratory which were subsequently taken up by pharmaceutical developers lent credibility to promises that translation could also occur out of current proposals being evaluated:

I think I'm lucky that some of my basic science has actually gone all the way so I can mention it. I'm not actually proposing it for the new one but they know I have done it before so it helps. (PI)

Referring to past (unanticipated) successes in this way helped present them as credible players in relation to fulfilling funders' interests in funding 'translational science', thereby increasing the likelihood of accessing further capital. This does not mean however a radical realignment of the scientists' agenda to meet challenges of translational science. It does suggest that translational science



is a useful slogan for them in framing interactions with important gatekeepers controlling allocation of scarce resources. Here then the label denoted a largely facilitative slogan in mobilizing resources and decoupling routine activities from the demands of 'external' agents. Past technical successes and clinically or commercially relevant initiatives could be retrospectively packaged as visible instances of translational credibility and thus enrolled into grant applications. This suggests that whilst the term translational

science holds strength as a promissory currency in external markets for research funding, it would continue to be mobilized in order to prosecute the strategic interests of the group and individuals. The limits of its instrumental usefulness come when it threatens disruption of existing routines and practices. As such it is striking just how flexible the slogan seems in building and placating expectations, including both clinical and commercial promises of fundamental cell biology research.

Early-career post-doctoral researchers

Post-doctoral researchers have become an important productive force in academic science across many fields, particularly biomedicine (Stephan 2012). Post-doctoral researchers typically account for these employment positions as a required step in structured career trajectories of scientists, looking to acquire further skills they hope will qualify them as competent practitioners of science and equip them with necessary forms of capital to pursue future employment opportunities in science (Laudel and Glaser 2008). As employees on fixed-term contracts, those wishing to build an academic career are preoccupied with beating off competition for a scarce number of non-fixed positions as laboratory leaders (Müller 2014). There was a pronounced lack of accountability amongst post-doctoral respondents towards articulating promises of translation from research. This meant at times they could also afford to distance themselves and even be dismissive of agendas of translational science promoted by more senior members elsewhere in the Institute. As an internal marketing device within the Institute the promotion of the term had in some respects failed to 'speak to' post-docs, from whom it courted some cynicism:

Interviewer: Would you be conscious of [the hospital's or clinical research centre's] presence?

Post-Doc 1: There's been sort of a lot of PR about it. It's like 'oh we've not got that centre, it's great' but I must say I don't really know what they're doing, like on a daily basis... But I definitely know we have that status and that's definitely great. And obviously they have the patients at the hospital here, so that's also great. But personally I'm not really thinking about it that often.

However, where the post-doc researchers did identify with translational science was in respect to instrumental goals of career development in science. Professional scientific careers are reliant on accrual and mobilisation of resources and reputations (Whitley 2000). The post-doctoral researchers in this case recognised continuing alignment with the research of the laboratory promised them a broad range of advantages from which their careers might profit. Regarding opportunities to mobilise future resources and reputations there was recognition that translational science stood for 'where things are going' and that to stand a chance of a successful career respondents increasingly should accommodate

this idea within their literary strategies and to some extent their actions. It was hoped joining forces with a PI and laboratory with reputations for translation in this area would make them a more marketable 'commodities' in future markets for scientific careers:

Interviewer: So is [translational science] something you are conscious of yourself, or...

Post-Doc 2: I'm not as much yet, but that's part of the reason I came to this lab, because I thought it would be a good place to learn how to think that way - because I never did that in my old lab as much. And I think that is an important skill just from a purely security point of view, for so much more funding nowadays you have to be able to have translational research, and be able to have ties to industry or potentially want to go into industry.

The post-doctoral researchers could quite easily switch between making translational promises on behalf of their basic research whilst distancing themselves backstage:²

I'm very respectful of the fact [research charities] are giving me funds and I want to answer a question that is very relevant to them, I'm not trying to cheat them for money. But that's not the reason I got into science, that's not the reason I continue to do science. It's not particularly about cancer. If tomorrow I decided I wanted to answer a question about neurobiology maybe I would go look at Alzheimer's. You have to have a disease process generally to get funding, that's just the reality. But I'm not motivated by it primarily in my research. (Post-doc 2)

This kind of account seems to contradict the outward-facing image others make of scientists in cancer research as especially motivated by the promise of 'translation':

Certainly, for the institute, it has a very explicit translational theme. And that's why many of the younger scientists and clinicians that are here now came to work here; because they perceived that this is a place where they, for their own work,

² As contrasted with the charity office worker who claimed to be normatively driven by the notion of translational science in her interview.



would be able to have both the infrastructure and the colleagues which would enable them to translate something for patient benefit. And that's actually quite a powerful motivation for many people. And that's why a lot of people want to work in cancer research rather than other fields of biological research. (Head Interview)

Although access to translational infrastructure was noted by the Head as a motivating factor for scientists joining the institute, these two post-docs cited efforts to pursue careers in academic science ahead of contributing to missions like 'curing cancer'. Despite skepticism, these early-career researchers were at the same time reactive to market signals regarding what makes an appropriate 'commodity' in scientific employment markets. Part of this response was articulated in terms of marketing themselves as

individuals in an institute or a group affiliated with translational science. Thus even whilst there was little vertical hierarchical pressure on these early-career researchers to demonstrate association with translational science, the lack of institutional security offered to them by the academic sector makes it difficult to avoid accommodating what were considered market demands. In the case of early-career researchers, norms of what makes an attractive young scientist appear to be re-drawn somewhat, with translational science activities sitting alongside traditional orders of worth like high impact publications. The post-docs' circumstances suggest questions about motivation and drive can become decoupled from actual practices, which are tied to external funding requirements to 'work on a disease'. As such the slogan translational science is consequential to staff at this level of the organization, and not merely a managerial pre-occupation.

Conclusion

This study has sought to explore the uses, significance, and limitations of translational science as a rhetorical device in the everyday conduct of research and how these have evolved out of accountability demands and activities expected of fundamentally-oriented researchers. In analyzing "basic scientists" accounts of the slogan in a cancer research laboratory, it was clear that informants carried certain ambivalences. For post-docs, the slogan was seen as connoting what is increasingly expected of early-career researchers as commodities in markets for academic careers: i.e. having a 'disease focus'. For senior research staff the term helped re-package past activities in a favorable light and add credibility to generic promises made about future 'impact', be it commercial, clinical, or civic, (Lander and Atkinson-Grosjean 2011). For the research manager responsible for demonstrating the 'societal impact' of the institute through the UK REF exercise, the term translational science can be enrolled to 'shine a light' on what they are already doing, and to make leaders of research groups accountable to this agenda. Clearly then there is a productive function which comes from drawing on this slogan. From researchers' perspectives, the term partly connoted a repackaging of more or less existing practices and could thus be considered useful and non-threatening. The 'threatening' side of translational science rests on possibilities it might reconfigure their actual knowledge making activities (rather than rhetorical statements), thereby distracting them from what they have been successful at hitherto. Scientists need not usually resolve such tensions in a logically consistent way in their accounts, but rather tend to switch between oppositions to fit the situation posed to them (see Gilbert and Mulkay 1984). However there was also concern that paying lip-service to translation promises would become less and less effective as a buffering strategy.

In reflecting on the norms and strategies outlined in informants accounts, it is notable how the forms of promises the researchers evoke under the slogan translational science mention very little (if anything) of cure. Historical and sociological studies have

been long concerned with the promises through which cancer research in particular acquires significant sums of funding, given cancer's status as both a scientific object and a medical problem (Lowy 1996). Analyzing how informants from this site responded to the slogan is revealing of the kinds of assumptions and values which seem to be taken here as acceptable in this kind of academic setting. The slogan appears to be transgressing boundaries between academic cancer scientists as mission-oriented researchers fighting to cure cancer and other motivations they pursue as employees trying to build academic careers and reputations. The findings suggest translational science is just the kind of malleable packaging needed to be responsive and attentive towards multiple accountability demands made of academic organizations, projects, and individuals. The efficacy of the slogan as a rhetorical resource is in retaining enough of the old promises of cancer research – that discoveries might translate into new therapies and devices – whilst keeping more immediate accountability demands at arm's-length. The slogan evokes a non-specific future pay-off which in turn hopes will lend short-term support and legitimacy for conducting biological science (Borup et al. 2006). The extension of the term into pithy promissory statements in grant applications was a case in point.

As connoted through accounts of innovation like 'Pasteur's Quadrant', Academic Capitalism, and the 'Triple Helix' model of university-industry-government relations, today's medical science field is a highly commercialized one. Whilst enabling exploratory biological research, the demands for translational science were said to restrict the spaces of possibility for working with cell signaling processes in ways adjudged not to be associated with cancer, or at the very least, other diseases like Alzheimer's. Having a disease focus was said to be of central strategic importance to developing a research profile that would make early-career post-doctoral researchers from the laboratory marketable as commodities in an academic jobs market. Senior researchers recognized third



party funders held the inclusion of statements regarding translational potential as 'obligatory passage points' in securing funding. Therefore the term's usage appears to legitimate modes of research which are 'fundamental', yet not 'curiosity-driven': at least not driven by curiosity of an individual, autonomous academic subject. This usage reinforces a discourse where satisfying interests of the scientists' context are morally permissible, whereas following the individual scientist's curiosity is deemed 'indulgent'. Yet what counts as a 'useful context' was often reduced to the interests of industry or the 'entrepreneurial university'. In the field of contemporary biomedicine in which researchers are routinely subjected to market pressures formerly associated with the private sector (Mirowski 2011), this appears to be resulting in a tendency to over-promise concrete (often meaning marketable) results of even fairly basic medical research.

Of course, this case is not exhaustive of all the ways cancer researchers use a slogan like translational science, yet it has illustrated knowing how and when to deploy this slogan and responding to its various connotations was part of getting on in this setting. Analytically the kinds of uses to which it is put and the connotations it comes to carry is revealing of the kinds of promises which

appear to hold currency in a climate increasingly characterized by academic audit and 're-contextualized' science. This study has aimed to contribute to emerging social studies on translational science, by illustrating the kinds of demands being set for biomedical researchers in light of changes in their relations with industry, government, and other actors (Etzkowitz 2008, Nowotny, Scott, and Gibbons 2001). Future studies can profit from further investigation of the institutional conditions and settings in which this slogan appears to travel and prosper. Rather than dismissing such slogans as 'mere rhetoric' or fashionable policy or managerial buzzwords, following their reception and mobilization in different epistemic and organizational contexts can be revealing of the kinds of relations being formed in academic research and the forms of discourse which come to legitimate them.

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