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Resist, scientist! Countering degradation rituals in science

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When the work and reputation of scientists suffer ritual degradation, a range of tactics can be deployed to resist and rework the psychological and social impacts. Five key resistance tactics to degradation in science are revealing degradation rituals, redeeming the reputation of the targeted scientist, reframing the degradation as unfair, redirecting attention to other domains, and refusing to cooperate with the rituals. These tactics are illustrated through three case studies of scientists targeted for conducting research threatening to the interests of powerful groups.

Introduction

The perceived trustworthiness and competence of scientists are key forms of currency in science that facilitate their careers and standing in the field. Attacks on the reputation of scientists and the quality of their work therefore can have far reaching impacts. These include professional impacts, such as the interruption or destruction of scientific careers, status impacts from loss of qualifications and income, and personal impacts, such as alcoholism, depression, and loss or disruption of relationships with colleagues, friends and family. The adverse impacts of attacks on scientists also include the potential hindrance of scientific innovation, often via the chilling effect on peers who witness the treatment of those targeted.

We focus here on one particular way of understanding methods for attacking dissident scientists, namely as a degradation ritual in which the status and honour of an individual are lowered. Such rituals have received relatively little attention, yet they are crucially important when considering the obstacles potentially faced by innovators in the face of a hostile establishment or orthodoxy. We focus on ways of challenging these rituals, something hardly ever analysed, in the hope of offering insight to innovators in all fields.

Features of degradation rituals can be classified in terms of the types of agents who enact the rituals, the contexts in which these rituals occur, the means by which degradation rituals are performed, and the impacts or relative severity of the rituals (Thérèse and Martin, 2010). Here we propose a complementary five-part schema to classify and understand tactics of resistance deployed by targets of degradation rituals in science in their attempt to deflect attacks and undo the negative impacts on their personal identity and professional status.

Given that stakeholders in current knowledge and practices are often threatened by innovators, and have the resources and authority to impose sanctions, it is to be

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expected that innovators are likely to be targets for degradation rituals. Understanding methods for resisting such rituals and their effects is therefore useful for those who seek to challenge powerful groups or orthodox views and those who support a system of science that is genuinely open to new ideas.

Our approach draws on a variety of literatures. One is writing on degradation rituals, as discussed in the following section. Another is research on suppression of dissent, especially in science (Moran, 1998; Martin, 1999), which can be located within the wider context of free speech and free inquiry. A third relevant body of literature is the study of strategy and tactics in social engagements (Jasper, 2006; Martin, 2007). Studying tactics against degradation rituals can contribute insights into the study of degradation rituals, dissent and social strategy. This is thus an interdisciplinary exploration of an issue with relevance to several fields.

In the next section, we outline our approach to ritual in general and degradation rituals in particular and summarise the implications of this approach for exploring the role of ritual degradation in science (and potentially in other professional or social contexts) and key forms of resistance to its effects. We then outline five key types of tactics for resistance to degradation. Subsequently, we apply our model to three cases of scientists whose work and reputation suffered different forms of ritual degradation, illustrating the tactics of resistance adopted by the targets. In the conclusion, we reiterate the value of viewing attacks on scientists in terms of ritual degradation and the need for further research on 'resistance work' in science and other professional contexts, namely where attempts are made to restore reputations that have become, in the language of anthropologist Mary Douglas (1966), 'polluted'.

A political approach to ritual degradation

The traditional functionalist approach to ritual presumes that it ensures social integration and social reproduction (Durkheim, 1995/1914). However, this approach provides no obvious handles for conceptualising resistance. For our purposes, we adopt instead a perspective on ritual that enables a better understanding of social systems that are contested or deserve to be. While rituals can be seen as expressions (Geertz, 1973) or performances (Turner, 1974, 1982) of core values in any socio-cultural system or group, they can also be usefully understood as forms of strategic action geared to produce specific social and power effects that may not always be achieved.

Useful for our purposes is the notion of ritualisation, which has been advanced especially in the work of Catherine Bell (1992, 1997) as well as others (Lukes, 1975; Bloch, 1989; Bourdieu, 1991; Rappaport, 1999; Couldry, 2003). This concept highlights distinctive and strategic practices that aim to mark off certain activities, persons and things as privileged or 'sacred' while others are demarcated as anathema or 'profane'. While this idea echoes the sacred/profane distinction made famous by Durkheim, and commonly used to explain social order and reproduction as opposed to social conflict and change, the strength of this approach to ritual is sensitivity to contexts where these practices may not achieve their goals. Ritualisation serves both to give particular individuals or groups privileged access to symbolic and material resources (such as credibility, status, funding and jobs) and to limit or exclude access by others. The study of degradation rituals brings into sharp relief the virtues of an understanding of ritual as an exercise of power.

Some rituals, such as rites of passage (van Gennep, 1960), transform subjects into valued social categories, for example, boys into warriors or separate individuals

into married couples. In contrast, the targets of degradation rituals suffer either status demotion within the group or are completely excluded from legitimate group membership. Most if not all societies deploy formal and informal rituals designed to humiliate, shame and 'spoil' the identity of individuals who have transgressed social norms (Goffman, 1963). More formal and stylised degradation ceremonies performed in the presence of a representative audience involve either the symbolic and literal expulsion of the individual from the group, or a reduction of that person's status within the group setting. Relatively informal, less-stylised rituals of degradation, such as shunning, ignoring, excluding or berating a person, may also result in tainting or polluting a person's identity and in-group status (Cox, 1970; Weinstein, 2004, p.218).

In a classic paper, Garfinkel (1956) proposed the conditions required for a successful degradation ceremony: an institutionally-authorised denouncing agent who administers the degradation on behalf of the group; a denounced agent who is the target of discipline and punishment in the form of demotion or expulsion in response to a perceived transgression of social norms; and an assembled audience serving to ratify the legitimacy of the event and to evoke shame, humiliation and passive acceptance in the target. In essence, a degradation ritual can be seen as a recurring means by which groups attempt to ensure the compliance of their members with social norms by expelling or lowering those who appear to flout them. Garfinkel's approach to degradation can be seen as functionalist: he did not consider the possibility of resistance to the degradation ceremony by the target (the degraded agent) or the audience. (Indeed, Garfinkel did not consider the notion of audiences separated in time and space from the original degradation ceremony.) By considering degradation rituals as types of power struggles, we are able to examine resistance and its potential benefits.

Degradation rituals, such as punishment rituals, have been investigated in subsistence-based societies historically studied by anthropologists. The concept of degradation rituals has also been applied to a wide variety of other social and organisational contexts including the treatment of entrants to 'total institutions', such as asylums and military camps (Goffman, 1961); proceedings in legal and courtroom settings (Antonio, 1972); punitive management practices; and corporate organisational rites, such as change management (Moch and Huff, 1983; Trice and Beyer, 1984; Loeser and Burrus, 2009); health care procedures, such as questionable but popular surgical techniques or the collection of sensitive medical histories (Brown *et al.*, 2003, pp.230–31); punishment of corporate crime (Levi, 2002); educational settings (Hull, 1976; Westhues, 2004); and media practices (Carey, 1998; Yadgar, 2003).

In contrast, there is a lack of research on degradation rituals in science, including their nature, effects and responses to them (for treatments, see Thérèse [2003, 2011] and Thérèse and Martin [2010]). It could be argued that studies of 'boundary work' in science – contestations over the demarcation of science from non-science, for example astronomy from astrology (Gieryn, 1999) or even delineations within science that suggest a spectrum of ritual pollution (Swedlow, 2007) – imply, but have not made explicit, the notion of ritual degradation in science. The five-part schema we present of resistance tactics to degradation is both empirical – with insights drawn from a range of case studies in science – and instructive. It is intended to be useful as a resource for those seeking to deflect or renegotiate the potentially severe psychosocial and professional impacts of degradation rituals.

Resisting degradation rituals in science

In order to stimulate ideas for resisting degradation rituals, it is helpful to examine the ways in which powerful individuals and groups reduce adverse reactions to actions potentially perceived as unjust. Consider, for example, torture, something universally condemned, but carried out by many governments in the world. To reduce outrage from torture, a crucial technique is to hide it: torture is nearly always carried out in secrecy. Those who are tortured are commonly devalued with labels such as criminals, terrorists or enemies. When torture practices are revealed to wider audiences, they might be said not to be so serious (as in the case of sensory deprivation), a result of 'rogue operations', and labelled 'abuse' rather than 'torture'. Sometimes investigations are carried out, usually exonerating perpetrators or imposing light penalties on low-level operatives. Finally, opponents of torture may be threatened or subject to reprisals. These five methods of outrage management are:

(1) cover up the action;
(2) devalue the target;
(3) reinterpret the events by lying, minimising, blaming and framing;
(4) use official channels to present an appearance of justice; and
(5) intimidate targets and observers.

Each of these five methods was used in relation to torture of Iraqi prisoners by US prison guards at Abu Ghraib in Iraq, exposed to the world in 2004 (Gray and Martin, 2007). The same five methods are also found in a range of other areas, including censorship (Jansen and Martin, 2003), sexual harassment (McDonald *et al.*, 2010), massacres (Martin, 2007) and genocide (Martin, 2009). Therefore, it is plausible to assume the same methods might be employed to reduce outrage from the use of degradation rituals.

To increase outrage over injustice, each of these five methods can be challenged. This gives rise to the following counter methods (Martin, 2007):

(1) expose the actions;
(2) validate the target;
(3) interpret the events as unjust;
(4) avoid or discredit official channels; instead, mobilise public support; and
(5) resist intimidation.

These five counter methods can be conveniently encapsulated in five Rs: reveal, redeem, reframe, redirect and refuse. We propose these tactics as plausible ways to resist degradation rituals in science and potentially in other professional and social domains. No necessary chronological sequence is intended by our sequential consideration of these five tactics; nor do we suggest that these activities are exhaustive of all potential outrage-management techniques. We also acknowledge that these are overlapping, mutually-supportive rather than discrete forms of action.

To illustrate these tactics in relation to a degradation ritual, we use the example of employers requiring workers to see employer-chosen psychiatrists, a technique commonly used to discredit and dismiss whistleblowers (Lennane, 2000). Workers who refuse can be penalised or dismissed for refusing orders. Seeing a psychiatrist carries the risk of being certified as insane, especially by 'hired gun' psychiatrists

who serve the interests of employers, and then dismissed. For co-workers to think of one as mentally ill is degrading, and visiting a psychiatrist can be a degradation ceremony.

Reveal: expose the hidden features of degradation rituals

Instead of allowing the degradation ritual to be enacted in a private setting or in a context that prevents transparency, the whistleblower could (overtly or covertly) record the session with the psychiatrist or could bring a perceived impartial witness to counteract any misleading accounts of the session. Exposing the details of the degradation experience to other audiences, like the potential positive effects of the 'reframe' tactic covered below, works on a number of levels: it can show the unfairness and illegitimacy of the degradation; it can reveal the vested interests of degrading agents and the benefits they may gain from their actions; and it can galvanise further support from (and alliances with) others who have suffered similarly or who are outraged by the injustice that has been perpetrated against the target.

Redeem: act in ways that undermine the legitimacy of the degradation

To retain or regain credibility, the worker needs to come across as a sane, rational person who, far from being distressed, continues to act in accordance with workplace expectations and to do good work. Maintaining a professional and calm demeanour undercuts derogatory accusations, particularly in the eyes of co-workers and other parties who might be enrolled as supporters or allies.

Reframe: re-describe the actions to audiences as (illegitimate) degradation rituals

Reframing involves describing ritual degradation as an act that unfairly damages the worker's status. An employer's directive to see a psychiatrist can be recast as a reprisal for whistleblowing. Reframing can involve exposing the interests of the parties who are enacting the degradation, and the benefits they stand to gain. For degradation targets, reframing provides an important counterpoint to employer explanations.

Redirect: act outside the domain of degradation

Using official channels, such as grievance procedures and ombudsmen, implies acceptance of the system. Official channels typically are slow, procedural and reliant on experts (such as lawyers). Because many people believe that official channels dispense justice, using them usually reduces outrage (Martin, 2007, p.197). The counter-tactic of redirecting involves taking the issue to wider audiences – a different domain – and not relying on official channels. For a worker referred to a psychiatrist, using official channels might mean appealing the request. Redirecting might involve refusing to attend, knowing that many referrals lack formal justification, publicising the demand and refusal, and cooperating with other workers who have been similarly targeted to organise protests or other forms of resistance. Redirection could also involve abandoning the degradation domain, for example, by finding employment elsewhere while continuing to build alliances with others to contest attacks.

Refuse: refuse to participate in or accept the legitimacy of the degradation ritual

The target may refuse to see the employer-appointed psychiatrist or, should this prove inadvisable (e.g. it could lead to dismissal), challenge the rules of the requirement by providing a written statement for the psychiatrist. The personal benefits of this tactic include protecting against the emotional and psychological impacts of degradation through a refusal to accept the legitimacy of the directive or to internalise negative attributions of the self as incompetent or insane. Such a stance may provide the target with the courage to resist further degradation rituals and their associated identity and status impacts. Refusal in the first instance relies upon a realisation that attacks may be unfair (a violation of due process), unwarranted and vindictive. This tactic may provide some measure of relief to the target and be the first step towards marshalling resources to respond to, and deflect or rework, attacks. The social benefits of refusing to participate in the degradation ritual are linked to setting up the necessary preconditions for enacting other forms of resistance, such as building alliances and witnesses and revealing the vested interests at play in the degradation.

In the next three sections, we present case studies of scientists who experienced degradation in the course of their careers and whose cases exemplify the five tactics we have described above. We draw on publicly available information, including extensive interviews in the first two cases (Thérèse, 2003). Each scientist has checked our treatment of their case, though they do not necessarily agree with our conclusions.

We have chosen these particular scientists because each one experienced extended attacks that allow analysis of tactics, and because we have previously studied their cases (Thérèse, 2003; Thérèse and Martin, 2010; Martin, 2014). We chose two cases in which resistance to degradation has been reasonably successful and one in which it has not. Including a case in which many observers consider the degradation was justified serves to emphasise that studying resistance to degradation rituals does not imply that the resister is necessarily worthy in current or future judgements. All three scientists are white males whose first language is English; future research would be needed to investigate any special features of degradation struggles involving women and other nationalities, as well as cases outside science.

Each scientist adopted one or more of the five anti-degradation tactics on an *ad hoc* basis as their experiences unfolded, rather than conceiving some grand strategy in advance. Even so, through experience they became more sophisticated and self-conscious about their tactics. In presenting these cases, we do not pass judgement on either their research or the fairness of the actions taken against them; our purpose is to illustrate tactics of resistance to degradation rituals.

Robert Baker

Robert Baker is a mathematical modeller and geographer with the School of Human and Environmental Studies at the University of New England in regional Australia, where he is now an associate professor. Baker's higher education and academic work history show repeated instances where his attempts at disciplinary innovation – applying statistical physics to human geography and spatial behaviour, and researching sea levels in the Holocene era – were met with episodes of ritualised degradation in private, semi-public and public contexts. The account here draws especially on Thérèse (2003; see also Thérèse and Martin, 2010).

In the third year of his undergraduate degree undertaken at a leading Australian university in the early 1970s, Baker prepared an assignment presenting evidence for Holocene sea levels being higher than current sea levels. His assignment noted the existence of platforms in beach sites south of Sydney approximately two metres above current sea level with fossilised sea worms that can thrive only in the middle of the tidal range. Baker was actively discouraged from pursuing this work with his lecturer instructing him to 'concentrate on other things' and to 'toe the line'. This subtle form of suppressing dissent was attributed by Baker himself as linked to the interests of departmental academics who had recently published work (Thom *et al.,* 1969, 1972) debunking the hypothesis of higher sea levels in the late Holocene (Fairbridge, 1961).

As a result, Baker shifted the research focus of his honours degree towards applying mathematical models from statistical physics and statistical mechanics to human behaviour in urban systems, such as travel flow dynamics, an approach that appeared to be at odds with the prevailing qualitative tradition in Australian geography at that time. Baker's willingness to alter his research interests is an example of *redirecting* his efforts to scientific domains outside the context of devalued scientific work. However, his exploration of the utility of statistical models of human trip behaviour was also met with severe, humiliating semi-public and private degradation rituals. During a seminar presentation of his honours research, Baker suffered a public degradation ceremony, where senior academics decried Baker's methods and derided the quantitative revolution in the field. This episode is reminiscent of Taylor's (1976, pp.138–39) sociological analysis of the quantitative debate in British geography, which noted the generation gap between 'older geographers with little quantitative skills' and newcomers with 'some knowledge of statistical techniques'. To overcome the disrespect of the young, disciplinary elders could either integrate innovation to project an aura of disciplinary continuity, or attempt to banish the heretics altogether; for instance, through hard line assertions that the quantitative turn was not really geography.

Following this event, Baker's two mathematics supervisors – appointed by the department in addition to a geography supervisor, given the interdisciplinary nature of his honours research – became increasingly critical of his work. His pure mathematics supervisor withdrew from mentoring him altogether. Baker recalls that just as he was ready to submit his thesis, his geography supervisor threw the unbound thesis into the air while yelling insults about him and his work, with Baker scrabbling to collect the strewn pages from the office floor – a highly humiliating event. A further public degradation was his receipt of the lowest possible pass mark for an honours thesis, second class division two, a veritable death knell for further progression in an academic career. Indeed, Baker left academia and became a secondary school teacher, a form of redirecting or acting outside the context of degradation.

Despite these experiences, Baker continued to apply statistical mechanical models to transportation/travel behaviour, and prepared articles, based on his honours research, that he submitted to a range of Australian journals. This shows Baker's refusal to accept passively the legitimacy of the degradations he had suffered. Despite repeated rejections from Australian journals, he sent his work to international scholars, including Eric Sheppard at the University of Minnesota, who were adopting similar approaches to human geography. He received constructive feedback and emphatic encouragement to continue his line of research and submit his work for publication. Redirecting by seeking support beyond the domain of the degradation rituals worked

to repair his shattered self-confidence, prompting him to undertake a masters degree and see the successful publication of his transportation research in a number of international journals (e.g. Baker, 1981, 1982a), many years after receiving his honours degree in 1974. Despite international vindication of his work, Baker would nevertheless face further difficulties in the course of his masters research that, again, used mathematical models of human journeying behaviour. In an experience that eerily echoed his honours degree degradations, his two supervisors called him in for a meeting where they derided his work as 'thought patterns belonging to another planet' and told him he was 'fucked in the head'.

The episode so demoralised Baker that for 18 months he contemplated abandoning his masters project even while he continued to submit articles for publication that were accepted in international geography and traffic engineering journals. At his final interview, where consideration was being given to the termination of his masters degree, Baker advised the department chair of his problems with supervision and also pointed out that he had had several papers published or accepted for publication in top international journals (see Baker, 1981, 1982a, 1982b, 1982c, 1983), an exceptional achievement for a part-time masters student. After reading the published papers and receiving positive feedback about Baker's presentation at an international conference, the chair decided to supervise Baker himself and dismissed his previous supervisors.

Successfully publishing his work beyond Australia was a key factor in Baker redeeming his blemished scientific status. The independent verification of his work by foreign scholars and independent peer reviewers would provide him with the social resources both to deflect accusations of flimsy science (let alone, mental instability) from his masters supervisors and to gain respect from a powerful disciplinary elder who took over supervision and encouraged him to continue in academia. After his masters examiner advised that his thesis could, with minimal extra work, have been submitted as a Ph.D., Baker undertook part-time doctoral research while working as a secondary school teacher and continued to publish papers (in both Australian and international journals) as a form of 'vaccination' against any further attacks (Baker, 2013, personal communication). These achievements worked to redeem his polluted scientific status in the Australian context and reframe the degradations he had suffered as illegitimate attacks based more on entrenched paradigms and professional rivalry than incompetence.

After receiving his Ph.D. and obtaining his first academic post at the University of New England, he returned to his earlier interests on variable sea levels in the late Holocene only to find that the taint of controversy, while not as severe as in his undergraduate days in the 1970s, had nevertheless remained around this particular hypothesis. However, an increasing number of scientific workers both within (Gill and Hopley, 1972; Flood, 1983; Flood and Frankel, 1989) and beyond Australia (Coudray and Delibrias, 1972) were positing varying sea levels for the late Holocene and would provide the necessary material and symbolic resources to see a measure of acceptance for this work. By this stage, repeated experiences of degradation had heightened his awareness of tactics he could use to deflect attacks on his scientific work and status. He likened his defence strategy to a military campaign.

First, Baker worked to form a robust network of scientific allies, consisting of both national and international researchers, who were also discovering evidence of high sea levels within the past 6000 years. Baker forged connections through strategic citations in his publications and by co-authoring publications (e.g. Baker *et al.,* 2001).

Forming a collective of like-minded researchers using consistent methods and delivering similar results can be seen as active resistance to, and deflection of, attacks. It works to redeem oneself from accusations of being a lone maverick, and to reframe denouncements as illegitimate degradation rituals that stymie new knowledge. Publishing with a network of international researchers also undermines a subtle form of degradation that involves ignoring or masking the existence of work challenging orthodox theories. Lastly, Baker used media representations (for instance, in a television science magazine [ABC, 2000]) and participated in academic research on scientific controversies (Thérèse, 2003) to reframe his experiences as forms of suppression of dissent and to reveal intricacies of the degradations he suffered during his scientific training. Taken together, these five tactics have paid off for Baker. He has continued to publish and teach in the two key areas of geographical research that stimulated his passion, even though they had previously provoked traumatic experiences of degradation. He has received research grants, served on editorial boards and prestigious committees, and received a research award from his university.

Peter French

In 1997, Peter French, a cellular biologist working in the biomedical research field, began exploring the biological and potential human health effects of microwave radiation emitted by cellular or mobile telephones. At that time he was principal scientist at the Centre for Immunology in Sydney's St Vincent's Hospital. Because leading authorities considered exposure to low-level, non-ionising microwave radiation to be harmless, French's *persona* and work attracted implicit and explicit attributions of deviance from the telecommunications industry as well as scientific peers and government-appointed scientific bodies (Thérèse, 2003).

After early experiments by French and his colleagues showed that microwave radiation similar to that emitted by mobile phones triggered biological effects on growth and metabolism of human and animal cells in culture, French advised the media of a possible public health issue. Initial media coverage of his work attracted attention and criticism from the telecommunications industry. Engineers from the research arm of Australia's major telecommunications company, Telstra, visited the Centre for Immunology. In the spirit of open discourse and debate, French allowed representatives of Telstra Research Laboratories (TRL) to inspect his team's radiation exposure system. The system and the experimental data reported in French *et al.*'s publications were subsequently denounced in a TRL report, later circulated in a range of fora, including a scientific conference on mobile phone radiation (MPR) effects. French's physicist colleague, David McKenzie from the University of Sydney, who co-authored early articles on their research (French *et al.,* 1997; Donnellan *et al.,* 1997), attended the conference to argue for the validity of their experimental system and the data it produced, an example of reframing the derogatory industry report.

Despite having published several peer-reviewed articles on the biological effects of MPR and being one of only three groups in Australia conducting MPR research in the late 1990s, French and his collaborators experienced other forms of scientific degradation in the form of blockages to mainstream research funding, collaboration and career advancement. For example, his group's application for funds under a specific Australian government grant for research on MPR effects was marked poorly and discounted on the basis of the irrelevance of cellular biological experiments to

the field. (Ironically, these research funds were made available in part as a result of French's public profile and the airing of his views that mobile phone radiation may not be as biologically inert as had been assumed.) Promised collaborations with researchers from other institutions failed to proceed. One potential collaborator admitted to French that management had warned against working with him because a major telecommunications network provider made donations to his employer. French also found his applications for membership of various expert panels and committees, where he might have influenced the direction of research and public health policy on MPR, repeatedly rejected.

French's scientific reputation suffered particularly serious degradation when a document explicitly denouncing his scientific credentials and intent was circulated among a group of leading researchers, advisors and industry representatives in the field. The document had been prepared by an employee of a government-appointed technology standards-setting body and analysed submissions to the Australian Senate inquiry into electromagnetic radiation (SECITARC, 2001). French's submission to the inquiry outlined his group's peer-reviewed, published hypothesis for a mechanism by which MPR might trigger diseases, such as cancer. It also referenced other research indicating MPR impacts on cells, organisms, animals and humans. Though French's submission carried the weight of an array of scientific allies, the document specifically identified it in terms that undermined French's scientific credibility and questioned his research motivations (Thérèse, 2011). After he became aware of the document, French threatened to sue the organisation responsible for defamation. This resistance tactic reframed the degradation ritual as an unfounded attack on scientific reputation that would unfairly lead to a lowering of professional esteem. The tactic can also serve, should wider knowledge of the suit eventuate, as a threat to reveal details of the degradation.

The French case demonstrates all of the tactics suggested in our model. French repeatedly refused passively to accept derogatory attributions about his team's research by redirecting his activities to public fora, such as conferences, public speaking events and his centre's website, to rebut criticisms. He continued to undertake a range of activities that would redeem his work and his professional status. This included seeing his status affirmed when his presentation at the hearings of the Senate inquiry, mentioned above, indicated research worthy of a Nobel prize in the opinion of at least one senator. He also achieved redemption in formal scientific settings through development and publication of a testable and potentially falsifiable mechanism by which non-ionising MPR might cause harm.

He also redirected his activities across disciplines and universities to seek out and solidify research collaborations and achieved redemption through co-authoring with esteemed colleagues articles in top cellular biology journals (French *et al.,* 2000; Laurence *et al.,* 2000). He further redeemed his scientific status by refining a 'standardized package of research' (Fujimura, 1992), spelling out acceptable methodology and specific research methods to produce valid and reliable data through the manipulation of specific natural agencies. Ironically, the accolades from the Australian senator so redeemed French's scientific status in parts of the industry that the head of a previously vociferous detractor, Telstra Research Laboratories, offered to provide French with a cutting-edge microwave exposure chamber that would, given its source, provide a shield to industry criticisms that had dogged French *et al.*'s early experimental results.

Going to the media may backfire if scientific colleagues see communication in non-scientific forums as a shameful admission of failure, evidence of zealousness and bad sportsmanship, and grounds for marking down grant applications. However, for French, broadcast (e.g. SBS, 2000) and print media (Linnell, 2000) representations – reframing the degradations he experienced as attacks by groups with vested interests and revealing the details of degradations he had suffered – allowed him to secure alternative sources of research funding. A wealthy philanthropist who became aware of his experiences offered to provide funds for cellular experiments that would eventually see him and his work endorsed by other scientific researchers as innovative and cutting edge (e.g. Brown, 2002). Subsequently, French became deeply involved in a number of biotechnology and biomedical ventures and is currently CEO of a company spun off from Australia's Commonwealth Scientific and Industrial Research Organisation. The company holds a leading patent position in expressed ribonucleic acid interference ('gene silencing' technology) and undertakes research on therapies for conditions associated with specific genes and genetic disorders.

Andrew Wakefield

An academic gastroenterologist, Andrew Wakefield established himself in conventional scientific research, especially on Crohn's disease and bowel transplantation, authoring dozens of papers in scientific journals. In the late 1990s, he was promoted to reader and invited to head an experimental gastroenterological unit at the Royal Free Hospital in London.

In 1998, Wakefield was the first of 13 authors in a study of 12 children who had unusual gastroenterological symptoms possibly linked to the MMR (measles, mumps and rubella) triple vaccine. This case review study suggested that research should be carried out on a possible link between MMR and autism. The resulting paper was published in *The Lancet* (Wakefield *et al.*, 1998), a prestigious medical journal. At a media conference arranged by the dean of the hospital's medical school, Wakefield voiced his recommendation to use single vaccines for measles, mumps and rubella until possible risks from the triple vaccine were investigated. This led to a media storm about the risks of MMR (Goldacre, 2009), during which it was said that Wakefield's research and opinion had led to a decline in the use of the triple vaccine and hence to reduced measles vaccination in Britain. Some months later, the British government withdrew access to the single measles vaccine, with the result that the triple vaccine became the only easy way to be vaccinated against measles.

Vaccination is widely seen by health authorities as one of the most important medical success stories of the past century (Offit and Bell, 2003). Criticism of vaccination is often castigated as irrational and dangerous, as going against well-established scientific findings. The primary critics of vaccination are citizen groups (Hobson-West, 2007). Any scientist or doctor whose research or comments undermine the apparently unified scientific and medical support for the standard vaccination agenda of government health departments is seen as a threat, turning what appears to be a unified scientific position into a contested one (Martin, 2014). The paper in *The Lancet* was thus a threat to the orthodox agenda on vaccination – including promotion of multiple vaccines – and Wakefield, as first author, was seen as the key figure in contesting this agenda. Furthermore, Wakefield had been chosen

as an expert witness in a court case launched by hundreds of parents against pharmaceutical companies producing measles-containing vaccines, which reopened the potential of the companies being held responsible for adverse reactions.

The case collapsed in 2003 after the British government withdrew legal aid for the parents. In the following year, a science journalist, Brian Deer, alleged that there had been a conflict of interest in 1998 when Wakefield provided evidence on behalf of the parents' legal action having received research funding from the Legal Aid Board (Deer, 2004). The editor of *The Lancet* invited the authors of the paper to sign a retraction of some interpretations of the findings; Wakefield and three others refused. Deer's revelations led the General Medical Council, the British body regulating doctors, to launch an investigation into Wakefield and two of his co-authors. After the longest hearing on record, nearly three years, Wakefield was found guilty of several offences and stripped of his licence to practise medicine (General Medical Council, 2010). After the conclusion of the GMC investigation, *The Lancet* retracted the Wakefield *et al.* paper.

The GMC hearings and judgement, and associated media coverage, constituted one of the most dramatic and highly publicised degradation rituals imaginable for a scientist. Wakefield went from being an esteemed researcher to an outcast, labelled a fraud. A significant feature of the ritual was that the GMC judgement against Wakefield was continually raised by supporters of vaccination as implying the falsity of the link between vaccines and autism and, by implication, the lack of any scientific credibility for criticisms of vaccination or claims about adverse reactions to pharmaceutical products (e.g. Offit, 2010). Wakefield attended the GMC hearings throughout, preparing as strong a case as possible. An alternative course of action would have been to *refuse* to attend the hearings on the grounds that they were a facade for a pre-determined outcome. This might have been interpreted as a tacit admission of guilt, but the credibility of the GMC's findings might have been reduced without his participation.

A key step Wakefield took to restore his reputation was to write a book dissecting his entire ordeal and systematically addressing the charges against him (Wakefield, 2010). In relation to the key charge that he had not declared his conflict of interest in the paper in *The Lancet,* Wakefield pointed out that in 1998 it was unusual to declare connections such as his, providing figures to show how seldom such conflicts were declared at the time. Furthermore, he pointed out that Michael Rutter, one of his chief accusers at the GMC hearings, had repeatedly failed to acknowledge similar conflicts of interest (Wakefield, 2010, pp.174–77). In pointing to a serious double standard in the way he was treated compared with proponents of vaccination, Wakefield *reframed* the GMC charges. The book was a major attempt to *reveal* the features of the degradation ritual of the GMC hearings. As well, some of Wakefield's supporters have written about the hearings and their shortcomings (Long, 2009; Walker, 2012), but primarily for audiences in the alternative health domain, where criticism of mainstream medicine is commonplace.

In responding to his critics, Wakefield has behaved in a calm and professional manner. His book is carefully written, moderate in language and restrained in its assessment of his opponents. This sort of behaviour is an important part of *redeeming* his reputation. The content of Wakefield's book is a sustained attempt to *reframe* the degradation ritual as a reprisal for criticising vaccination orthodoxy. Wakefield left Britain and established a new practice in Texas, outside the domain of degradation in Britain. This is the tactic of *redirecting*.

Wakefield and his supporters have used all five of the methods for resisting degradation rituals, but overall without a great deal of success, for several reasons. One problem is with Wakefield's book. It is highly detailed and difficult to follow, befitting a scientist's concern for detail rather than a journalist's flair for story-telling. As a result, it has had only a limited impact. Hundreds of the parents involved in the court case against pharmaceutical companies rallied behind Wakefield, figuratively and literally. However, Wakefield kept his distance from their efforts, retaining his professional stance but perhaps missing an opportunity to mobilise greater support.

At least as important as Wakefield's actions have been the actions of his opponents. Vaccination proponents have repeatedly cited Wakefield's alleged transgressions of scholarly practice as a way of discrediting criticisms of vaccination. Indeed, for some proponents, Wakefield's very name is a signifier of the shortcomings of vaccination critics. Wakefield thus has been subject to an ongoing degradation ritual, in which his alleged faults from 1998 are continually touted as crucial signs of the hollowness of any criticism of vaccination. Added to this, journalist Brian Deer in 2011 published a new attack on Wakefield's work, published in the prestigious medical journal *BMJ* (Deer, 2011).

As a result of these events, Wakefield's reputation has a bifurcated character. In most scientific circles, and for some of the public, he has become the epitome of the discredited scientist. Some leading figures in the autism support community have refused to be involved with any organisation with which Wakefield is affiliated (Tommey, 2010). However, among many parts of the alternative health movement, Wakefield is a symbol of the courageous dissenter who ran foul of the medical establishment. One aspect of the division of opinion is divergent assessments of whether Wakefield *et al.*'s 1998 *Lancet* work has been subsequently discredited or vindicated. Vaccination proponents exclusively cite work showing there is no link between MMR and autism, whereas vaccination critics cite numerous scientific studies suggestive of a link.

One of the lessons from the Wakefield saga is that in responding to degradation rituals, there is no guaranteed road to success. Even though Wakefield used all five methods, they were far from enough to restore his reputation. Another lesson is that degradation rituals can become ongoing if a scientist is turned into a symbol of an entire movement that opponents seek to discredit or destroy. In such circumstances, rather than try to restore one's reputation, it may be better to adopt a new persona as a valiant dissident and to seek validation in different arenas.

Conclusion

Degradation rituals, as well as being highly traumatic for the individual involved, have a wide social impact, serving to bond communities against those singled out as transgressors of norms, and to warn others not to follow the same path. Although in some cases degradation rituals can serve a valuable function, in others they are highly damaging, for example, in the cases of dissidents and whistleblowers who raise the alarm about crimes and dysfunctions or who seek to promote innovations unwelcome to groups with vested interests.

There has been surprisingly little investigation of the dynamics of degradation rituals, with what studies there are spread across disparate literatures. Even less studied is how to resist degradation rituals, a topic that may have been ignored as a result of the reluctance of social scientists to examine tactics and strategy (Jasper, 2006).

To begin the study of degradation resistance, we have looked at three scientists who took steps to restore polluted reputations. To help make sense of the methods of resistance, we introduced a classification that can be encapsulated in five Rs: reveal what happened; redeem one's reputation; reframe the events; redirect action outside the domain of degradation; and refuse the degradation. The five Rs address five different domains for action: information, reputation, understanding, authority and power. In our three case studies, scientists experienced serious degradation, in each case by being associated with ideas considered misguided. The careers of these scientists were adversely affected, yet each persisted with science; each attempted to restore a damaged reputation. The three cases illustrate the full range of responses within the five Rs we have identified.

The study of methods of resisting degradation is potentially useful to scientists and others who wish to restore their reputations and continue their careers. The five Rs draw attention to different domains for resistance. The first method, reveal what happened, is helpful only if others can be convinced that an injustice has been done. Someone denounced for scientific fraud is unlikely to benefit by greater exposure of either the fraud or the degradation ritual – unless the fraud is trivial and the penalty disproportionately large. The methods we propose do not automatically improve reputations.

The second method, redeeming, involves behaving appropriately – being calm and rational as scientists are expected to be (but in practice often are not) – and being endorsed by reputable scientists either explicitly or implicitly through association with them, for example, in co-authorship. In essence, redeeming is a process of regaining respect, countering the image associated with the degradation ritual. The third method, reframing, is a process of explaining what really happened, which often means convincing people to reconsider the degradation ritual, changing their assessment from treating it as fair and justified to treating it as unfair, for example, because of prejudice, rigidity, vindictiveness, conspiracy or service to vested interests. Reframing is an attempt to persuade people to see things from the perspective of the target of degradation rather than the viewpoint of those who imposed it.

The fourth method, redirecting, addresses the question of legitimate authority. Many people assume that official procedures, such as appointments procedures, journal peer review, grievance procedures and formal inquiries, are fair and dispense justice. Their outcomes are widely considered to be legitimate (Martin, 2007, p.197). Targets of unfair treatment can try to seek justice through these procedures, but this often merely perpetuates and legitimates the injustice. The tactic of redirecting entails either challenging official procedures in order to discredit them, or trying to avoid them altogether and instead mobilising support. This tactic is often the most difficult for targets because they believe in the system and desperately seek vindication through it, even when the official system is the prime means by which they are being humiliated (Martin, 2013, pp.89–128). Finally, the tactic of refusing means not succumbing to degradation rituals. Instead of giving up and quitting science, which occurs in many cases, refusing involves continuing to struggle.

The three case studies show how these tactics can operate in practice. Each of the three scientists used all five types of tactics, though how these operated varied according to their circumstances. Baker and French were able to restore their reputations to a considerable extent. Wakefield, in contrast, remains an outcast in most of mainstream science while being lauded as a hero in sections of the alternative health

movement. Wakefield's trajectory indicates that strategies to oppose degradation rituals are never guaranteed to succeed. Outcomes are crucially dependent on the resources, energy and power of opponents.

In this analysis, we have not tried to assess the validity of the scientific claims of Baker, French and Wakefield. It might be argued that a scientist's reputation ultimately depends on whether his or her work is considered correct, which is a collective judgement by future generations of scientists. We would argue, though, that being subject to degradation rituals does not necessarily correlate with simply being incorrect scientifically. There are plenty of scientists whose contributions to research are still respected even though their ideas were later judged to be wrong, such as the opponents of evolution, relativity, quantum theory and continental drift. To challenge degradation rituals is not just a matter of seeking scientific vindication, but also a matter of challenging processes and attributions as unfair. This is not easy to do, so it is important to learn from those who have attempted to restore their reputations.

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