This is an Accepted Manuscript of an article published by Taylor & Francis in 'Science as Culture' on 27th April 2017, available online: http://www.tandfonline.com/10.1080/09505431.2017.1316253

To cite this article: Caldwell, E.F. (2017) Quackademia? Mass-Media Delegitimation of Homeopathy Education, *Science as Culture*, DOI: 10.1080/09505431.2017.1316253

Quackademia? Mass-media delegitimation of homeopathy education

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Abstract

In response to concerns about the standards of training for non-medically qualified homeopathic practitioners, between 1999 and 2009 a number of UK universities taught Bachelor of Science (BSc) degrees in homeopathy. All the courses were subsequently closed following media coverage of a vigorous campaign from scientists against the degree courses. A boundary-work analysis of 65 articles published in the UK print media reveals the use of metaphors from a number of different fields as rhetorical strategies to malign homeopathy education. As well as the commonly used contrasts of profit versus academic integrity, rationality versus faith and logic versus magic, media reports associated homeopathy with new universities and Mickey Mouse degrees, both of which had been denigrated in the press previously. In the press coverage, much attention was also drawn to the fact that the method of repeatedly diluting homeopathic medicines defies both logic and common sense, and the plausibility argument became a decisive blow in the debate over the legitimacy of teaching homeopathy as a science degree. It seems that the boundary work sought to protect the authority of both science and medicine by expelling homeopathy from higher education. These findings contrast with previous studies that suggest that orthodox medicine has occasionally expanded to incorporate desirable aspects of complementary and alternative therapies. Scientists carry out boundary work not just to demarcate the boundaries of science and directly defend their own interests, but also to protect the authority of other allied professions.

Keywords: Homeopathy, Complementary and Alternative Medicine, boundary work, thematic analysis, media discourse, higher education, medical education

Introduction

In 2009, one of the UK's most prominent pharmacologists, Professor David Colquhoun announced that his six year battle against homeopathy being taught in UK Universities had been won: *'*The last BSc (Hons) Homeopathy closes!...Today I checked again and NOW THERE ARE NONE*'* (Colquhoun, 2009, emphasis in original). Colquhoun's principle argument was that the material taught in homeopathy degree courses was not science and as such had no place being included in the curriculum of a Bachelor of Science (BSc) degree. As a Professor of Pharmacology, Homeopathy attracted Colquhoun's attention on account of the extremely high dilutions used to make its medicines, which mean that often none of the original substance remains in the finished remedy. To Colquhoun, the absence of active molecules in homeopathic remedies renders homeopathy 'plain fraud' (Colquhoun, 2008a, p. 61). Homeopaths maintain, however, that the process of making their medicines creates a remedy with therapeutic effects distinct from those of the original ingredients (Winterson, 2007).

The demise of the homeopathy degree defies a trend in recent years of the rise in the popularity of Complemenary and Alternative Medicine (CAM), and an increasing drive towards professionalization and legitimacy amoung its practitioners (Wahlberg, 2015). Selected aspects of CAM have been incorporated into the structures and institutions of British society, such as universities, legislation and the National Health Service (NHS). In a recent review of the sociology of CAM, Gale (2014, p. 805) points that that a key aspect to understanding the success of failure of a CAM therapy to be incorporated into the mainstream, is to interpret 'what is happening at a societal level to constrain and enable the patterns of social practice that we see'.

The driving force behind the development of university degrees in CAM was a clear need to ensure minimum standards of competency among practitioners in order to protect the public from harm (Wahlberg, 2007). Unlike in many other countries, in the UK the practice of CAM, including homeopathy, by non-medically qualified practitioners is permitted, under common law (Givati, 2012). In 2000 the House of Lords expressed concerns that the majority of CAM practice was unregulated and that that training varied widely across the sector. They recommended that CAM professions partner with higher education institutions to ensure proper standards of training and ensure 'the public are protected from incompetent practitioners' (House of Lords, 2000: summary). CAM degrees were given further support by a government report in 2008, which recommended that in order for a therapy to become regulated by a single register of qualified practitioners must be created, and 'the threshold entry route to the register will normally be through a Bachelor degree with Honours' (Department of Health, 2008, p. 14). Despite these recommendations, by 2009 all homeopathy degrees in universities had stopped recruiting students (Tomkins, 2009).

This article addresses three key questions that stem from the case of the demise of the BSc in homeopathy: What arguments from scientists were propagated in the media to remove homeopathy from the academy? How was the accreditation of homeopathy degrees by universities undermined by claims regarding the efficacy and plausibility of the therapy? What professional interests are associated with the delegitimation of homeopathy education? The next section of this article will give a brief outline of theory concerning how scientists work to construct and protect the authority of science. The article then details the background to the case and explores why universities set up degrees in homeopathy. This is followed by an analysis of the media reporting of degree level homeopathy education.

Analytical perspectives

Boundary Work

Bourdieu (1975, p. 19) contends that 'the scientific field is the locus of a competitive struggle, in which the specific issue at stake is the monopoly of scientific authority'. Gieryn's (1983) concept of boundary work describes the ways that scientists construct and maintain, through discourse, the boundary between themselves and what they consider to be non-science. Boundary work is based on the idea that that the borders of science are not determined by the intrinsic nature of science itself but rather by how scientists, and others, define science. As such, the borders of science are 'lines in the sand', and are constantly shifting as scientists and outsiders negotiate what is to be counted as science, and what is not (Jacob, 2015, p. 357). The aim of boundary work is for scientists to maintain their intellectual authority and autonomy in society, gain career opportunities and funding, and also to deny these to those who they deem to be non-scientists and as such, 'it is no mere academic matter to decide who is doing science and who is not' (Gieryn, 1983, p.781).

Gieryn (1999) developed the concept of boundary work and identified three distinct strategies used to redefine the boundaries of science: expulsion, expansion and the protection of autonomy. Expulsion aims to withdraw the status of scientists' rivals by clearly demarcating a boundary between science and non-science, and then expelling 'posers' from science (Gieryn, 1999, p. 16). Expansion involves science expanding its frontiers to include areas not previously incorporated into science. Lastly, scientists also engage in boundary work to protect their autonomy from outside influences, such as politicians, managers and the media (Gieryn, 1999).

Engaging in boundary work involves constructing the Self as positive, and pitting this against an irrational, different, or morally wrong Other (Hess, 1993). As Gieryn (1983, p. 791) describes : 'Just as readers come to know Holmes better through contrasts to his foil Watson, so does the public better learn about "science" through contrasts with "non-science"'. Hess (1993, p. 32) explains that 'the general logic of the boundary work is, "I'm scientific, you're irrational"'. Hess (1993) also found that the metaphors and rhetorical devices that are used in boundary work are related to those prevalent in the culture in which the debate is situated. For example, the Self in Hess' (1993) study was constructed as pioneering, optimistic and forward looking, which are often cited as positive attributes of American culture, whereas the Other was portrayed as being greedy, dogmatic and disorderly.

Boundary work often employs metaphors from a range of different fields, which serve to demonstrate the difference between good science and deviant or non-science. One common device is to accuse science's rivals as being motivated by profit or being too close to big business, rather than painstakingly verifying their research in the noble, but economically unrewarding, pursuit of scientific truth. In Gieryn's (1999) study the scientists who claimed to have demonstrated cold fusion were criticised for being more excited by the economic potential of their work than carefully checking their experiments. Moreover, in Hess' (1993) study of sceptics and parapsychologists, New Age authors were accused of propagating myths about the paranormal in order to sell books. Indeed both sides of the paranormal debate have at various times accused each other of being motivated by profit, albeit in slightly different ways (Hess, 1993).

Another widespread strategy for demarcating science from non-science is to compare rivals with religion or magic, as both as commonly considered to be a contrast to the rational logic of science. The sceptics in Hess' (1993, p. 63) study claimed that supporters of the paranormal were 'true believers' and Nerlich (2010) found that bloggers sceptical of climate change used religious metaphors to portray climate scientists as believers and the science of climate change as dogma. This is also a common strategy employed to denigrate CAM, which has often been dismissed as 'superstitious dogma' (Saks 1994, p. 87). Brooke (1992) argues that the origins of the use of magical metaphor, as a delegitimation strategy, lie in the campaigns against witches in the 14^{th}-18^{th} centuries.

Those engaged in boundary work also utilize associations with subordinated social categories, such as gender and race, to denigrate the Other. For example, nineteenth century neurologists classified mediums as having "mediomania", a mental illness particular to women (Hess 1993, p. 26). As Hess (1993) asserts, associating the paranormal or New Age with women and rational science with men, continues today. MacArtney and Wahlberg (2014 ,p. 115) point out that a number of critics of CAM have drawn attention to the fact that a large number of CAM users are women:

> In CAM meetings, [hearing patients' views] usually entails a patient telling the audience how marvelous her (it usually is a woman) Reiki healer, aromatherapist etc, has been compared to her ghastly experience with mainstream medicine. These lectures are usually loaded with emotion and devoid of anything remotely resembling data, evidence or rational thought. (Ernst, 2011 cited in MacArtney and Wahlberg, 2014, p. 115)

As the above quote demonstrates, there is an implication not only that CAM users are female, but also that they are emotional and 'devoid of…rational thought', which is the opposite to the detached and rational demeanor often cited as required for good science (Harding, 1986).

Hess (1993, p. 64) points out that simply accusing the Other of being materialistic, dogmatic or irrational is not sufficient to prevent them from being taken seriously. Instead, the use of ridicule and sarcasm serves to discredit the Other further, to the point where they are nothing but a laughing stock. For example, Hess (1993, p. 64) details Martin Gardener's comic descriptions of parapsychologists' protocols as '"the sliced-ping-pong-balls-over-the-eyes bit"'. Interestingly, those employing these rhetorical strategies may also be violating 'the ideals of scientific decorum', and sceptics and debunkers of pseudoscience have been described as 'scientific vigilantes who police the boundaries of acceptable knowledge' (Hess, 1993, p. 90). MacArtney & Wahlberg (2014, p. 114) concur, pointing out that the tactics of CAM skeptics could also be described as a 'flight from science'.

Gieryn (1999, p. 405) suggests that if we want to find out 'the answer to the question "What is science?"', we should look, not at what happens in laboratories or scientific journals, but to situations where 'explicit articulation' is taking place. One such setting is CAM and boundaries are a common metaphor used in conceptulising the relationship between CAM and orthodox medicine (see for e.g. Keshet, 2009; Jacob, 2015). Adams' (2004) study used Gieryn's (1983) boundary work theory to analyse the talk of GPs who practice CAM, as they demarcate themselves from non-medically qualified CAM therapists. This amounted to both a 'capture of CAM' and a gatekeeper role, as GPs are well positioned to 'exert a powerful influence over patient choice as to when and how unconventional treatments are to be employed' (Adams, 2004: 153). Hess (2004: 705) also charts the "transformation of the politics of suppression into to one of incorporation" as certain aspects of CAM are institutionalised through research programmes in a process of medical modernization. However, both authors point out that theories such as boundary work, have potential for greater application in medical sociology and in the sociology of CAM in particular. As Givati and Hatton (2015) point out, the campaign by prominent scientists against CAM degrees can be viewed in the context of boundary work, although to date no studies have examined this in detail. This study seeks to address this by analyzing the debate over homeopathy education in universities, a controversy that not only brings under scrutiny the border between science and non-science, but also the relationship between science and medicine.

Background to the case

The rationale for homeopathy degrees: safety, qualifications and regulation

Homeopathic medicine was developed in 1789 by the German doctor Samuel Hahnemann, and is based on the ancient concept of like cures like (Heirs, 2015). Many early practitioners of homeopathy were graduates from Europe's most prominent medical schools and the British royal family have retained a court homeopath since the 1830s (Ullman, 2007). The UK National Health Service (NHS) has three homeopathic hospitals, including one with a royal charter, and over 200,000 NHS patients a year are treated by doctors practicing homeopathy (British Homeopathic Association, 2016). In 2000 the House of Lords classified homeopathy as one of the big five, or principle, disciplines of CAM, which are considered to be the most professionally organized therapies (House of Lords 2000, 2.1). Despite being ranked as a principle discipline of CAM by the House of Lords, other classification systems place homeopathy in a lower position in their hierarchies (Wahlberg, 2007). The Prince of Wales Foundation for Integrated Health categorized homeopathy as being the 'other' category of therapies that have yet to consider state regulation (PWFIH, 2005). Furthermore, in 2006, *The Times* newspaper rated homeopathy as only worthy of one out of four stars for the research available to support its effectiveness (Murcott and Naish, 2006).

Whilst there are many different groupings within homeopaths, one important distinction is between those who are medically trained, and those who are not. Fully qualified and state regulated medical doctors, nurses and veterinarians who also practice homeopathy complete their medical degrees before taking courses in homeopathy. However, under UK law there is no requirement for someone practising homeopathy to have medical training and there approximately 2000 non-medically qualified (NMQ) or lay homeopaths practising in Britain (Heirs, 2015). The motivation for creating the university courses in homeopathy in the late 1990s was a desire to address the concerns about the standards of training for these lay homeopaths.

Lay homeopaths have been described as the 'reluctant profession' and some felt that the move toward a more professional, mainstream existence was the antithesis of homeopathic philosophy, which is sometimes interpreted as offering an opportunity for emancipation from medical orthodoxy, and even the state (Cant and Sharma, 1996). According to Wahlberg (2007, p. 2313), the drive for professionalization of CAM amounted to a 'normalization or disciplining of practice', and a number of CAM practitioners were resistant to this 'sanitisation' process (Wallis cited in Hess 1993, p. 33). One of the strategies involved in this normalization of practice was to teach homeopathy as part of a Bachelor of Science degree in universities. The curricula included anatomy, physiology and biochemistry alongside homeopathic philosophy and practice. However, one homeopath in Givati's (2012, p. 248) study of homeopathy education, claimed that esoteric homeopathic knowledge was diluted in university courses to 'appease the system' and 'placate the powers that be'.

Scientific challenges to CAM: Evidence, efficacy and legitimacy

As was shown in the previous section, when it comes to CAM the issue for the government and public has been primarily about safety and the proper training of practitioners. As Wahlberg (2015, p. 135) points out, the Department of Health in the UK has argued that professional regulation 'is about protecting the public, not about the efficacy of the therapies involved'. However, the issues for securing legitimacy for CAM within the medical and scientific communities can be divided into providing evidence of clinical legitimacy, or whether a therapy works, and scientific legitimacy, or whether scientists can explain how it works (Wallis and White, 2004). Winnick (2005, p. 38) has argued that the requirement for ever increasing amounts of evidence equates to the 'subjugation' of CAM and that scientific scrutiny has become the 'primary means of control'.

Much of the literature around the professionalization of CAM concerns claims of its threat to the dominance of the medical profession (Saks, 1994; Adams, 2004), and much of the discussion of the CAM knowledge base has concerned the clinical legitimacy of the treatments. Willis & White (2004, p. 58) claim that *'*clinical legitimacy is more important that scientific legitimacy*'* but in fact, outside biomedical science, the two arguments seem to go hand in hand and are often confused with one another. The House of Lords Select Committee report in 2000 stated that: 'While we accept that some CAM therapies, notably osteopathy, chiropractic and herbal medicine have established efficacy in the treatment of a limited range of ailments, we remain skeptical about the modes of action of most of the others.' (House of Lords, 2000, Summary).

Wahlberg (2007, p. 2312) suggests that medical pluralism in the UK today reflects a 'biomedical "us" versus a non-biomedical "them". In Polich, Dole and Kaptchuk's (2010, p. 106) study of CAM researchers, respondents spoke of wanting to seem 'more scientific', and that 'it is more credible to Western Medicine if we can come up with some sort of pathophysiological mechanism understood in Western terms' (Polich *et al*., 2010, p. 112). For acceptance by the biomedical community, a therapy must have a 'biologically plausible mechanism connecting putative cause and putative effect' (Ashcroft 2004, p.34). This is particularly important for clinical trials as a 'credible' prior hypothesis is required to interpret the data (Vandenbroucke, 1997, p. 824). However, as Ashcroft (2004, p.134) points out, 'what counts as plausible is contestable'.

For the biomedical community, '"plausibility" is something that is to be found through a molecular mapping of the pharmacokinetic and pharmacodynamics pathways that individual chemical compounds…follow as they are absorbed into and then disposed of by the body' (Wahlberg, 2008, p.52). For example, many pharmacologists would accept that herbs contain active constituents that can have a demonstrable effect on physiology. As such, it can be argued that 'although many herbal medicines are unproven, they have scientific plausibility' (Samarasekera, 2007, p. 1678). The key difference between herbal medicines and homeopathic remedies is that homeopathic preparations are made by repeatedly diluting the active substance 'so that not even a single molecule of active ingredient is left' (Samarasekera, 2007, p. 1678). This defies the tenets of molecular biology, as well as common sense, and this lack of biomedical plausibility has become a major issue for homeopathy (Cant and Sharma, 1996).

Supporters of homeopathy point to a number of potential mechanisms to explain how homeopathic remedies might work, which often invoke concepts from quantum physics (Winterson, 2007). In recent years research into the physiological effects of homeopathic dilutions has all but halted after the Benveniste affair (Schiff, 1995). The French scientist, Jacques Benveniste, claimed his experiments demonstrated that water could have a memory of the substances it once contained, which had the potential to explain how homeopathic remedies might work. Despite a publication in the prestigious science journal *Nature*, his results met with accusations of fraud and his scientific career was destroyed.

Homeopathy and the academy

The 1990s saw profound changes to the university sector in the UK, which formed the environment that surrounded the early years of the BSc Homeopathy. These developments combined to transform higher education, bringing a wide range of new students, courses and institutions into the sector. However, the higher education system in the UK remains highly differentiated 'with high status, research-led elite institutions at the top of the university hierarchy, and newer universities, with far lower levels of funding and prestige, at the bottom' (Leathwood, 2004, p. 31). In 2003, the Higher Education Minister, Margaret Hodge coined the term 'Mickey Mouse' degrees, a term which is usually associated with vocational degree courses taught at new universities and has been widely used in the media to decry a perceived fall in standards in higher education. Not only were the courses criticized, but institutions and students were also targets for derogatory remarks in public discourse. As Leathwood and O'Connell (2003, p.39) describe, terms such as 'Mickey Mouse students for whom Mickey Mouse degrees are quite appropriate' and the 'ghastly universities' were used publicly.

The 1990s also saw an increase in nursing and other health professions, such as physiotherapy, moving towards degree level training within universities (Eaton, 2012). New courses were created, and their biomedical science content resulted in many of the universities awarding prestigious Bachelor of Science degrees upon successful completion. As Gieryn (1999, p. 1) reminds us:

> "Science" often stands metonymically for credibility, for legitimate knowledge, for reliable and useful predictions, for a trustable reality: it commands assent in public debate. If "science" says

> so, we are more often than not inclined to believe or act on it – and to prefer it over claims lacking this epistemic seal of approval.

Consequently, science degrees carry a high level of respectability in society and a BSc degree serves as a *'licence'* that someone can be believed and trusted as a member of the scientific community (Barnes and Edge, 1982, p.2).

Following the model of other health professions, the University of Westminster, in 1998, validated the first Bachelor of Science (BSc) Homeopathy degree, run by the London College of Classical Homeopathy (Chatfield *et al.,* 2012). In the following year, the University of Central Lancashire started a BSc (Hons) Homeopathic Medicine and by 2006 there were five BSc degrees in homeopathy being taught in UK universities. The number of degrees in other CAM therapies also increased around this time and by 2008, there were 6,865 students studying on CAM courses in universities (Givati, 2012). Homeopaths that supported the creation of the BSc degrees felt that the courses would help bolster the respectability of the therapy, both as a step towards statutory regulation, and to lend credibility with the medical community and potential patients (Givati, 2015). The move reflected the trend for CAM therapies to 'attach themselves to the scientific paradigm' (Cant and Sharma, 1996, p.582) and as as Clarke et al (2004, p. 331) point out, this 'bitter pill… is considerably sweetened by the prospect of greater status and recognition'. However, despite the early enthusiasm homeopathy was later to become burdened by controversy resulting from it being taught as a science degree.

The tide turns: Homeopathy in the 21st century

After a dramatic rise in popularity during the 1980s and 1990s, Saks (2016, p. 577) describes the start of the new millennium as a 'political high water mark' for CAM, symbolized by the publication of the supportive report from the House of Lords Select Committee on CAM, in 2000. However, subsequent years saw a change in fortunes for CAM, and homeopathy in particular. In 2005, the *Lancet*, a leading UK medical journal published a review of 110 homeopathy trials, which concluded that homeopathy was no better than placebo (Shang *et al*., 2005). In the same year, a report commissioned by the Prince of Wales on the economic benefits of CAM for the NHS was vigorously criticized, including by the world's first Professor of CAM, who to the dismay of CAM supporters has a broadly skeptical stance towards CAM (Ernst, 2006).

In 2006 a number of high profile doctors and scientists started a letter writing campaign in national newspapers and medical journals for the NHS to stop funding CAM, and for homeopathic hospitals to close (Baum *et al*., 2006). As a result of this campaign, one homeopathic hospital closed and the Royal London homeopathic hospital contracted and changed its name. In addition a number of Primary Care Trusts, which at the time commissioned health services for districts in the UK, stopped paying for patients to have homeopathic treatment (BBC, 2007). There was also widespread coverage in national newspapers and on television of undercover investigations by a sceptic charity, Sense about Science, into homeopathic clinics that advised travelers not to take malaria medication (New Scientist, 2006).

The uproar among high ranking medics and scientists over homeopathy prompted Tony Blair, prime minister at the time, to comment 'I wouldn't bother fighting a great battle over homeopathy, I mean there are people who use it, people who don't use it, it is not going to determine the future of the world, frankly' and he urged scientists 'to concentrate on important issues' when it came to public battles (MacLeod, 2006).

In 2006, Professor David Colquhoun, not a medical doctor but an academic scientist, turned his attention to CAM education and universities that ran CAM BSc degrees. He sent information requests under the Freedom of Information Act to gain access to the teaching materials used on the courses. Colquhoun and others cited the materials on their sceptical blogs and in media articles as a way of ridiculing what was taught on the degree courses and denigrating the universities that ran them. In 2007 Colquhoun (2007) published a comment article about the homeopathy BScs, in the UK's leading science journal *Nature,* which was accompanied by a special report in the same issue. In his *Nature* article, Colquhoun (2007) argued that CAM is not based on real science, and therefore should not be taught as part of Bachelor of Science degrees. The debate over the legitimacy of CAM was not longer restricted to technical discussions of clinical trial data on the pages of medical journals, but Colquhoun's pithy arguments that CAM was not science were now to hit the mainstream.

The *Nature* article was widely reported in the mass media and Colquhoun's prolific blog provided a valuable resource for reporters covering the story. Moreover, Colquhoun was also regularly interviewed and profiled by journalists. Fairclough (2015) argues that media producers decide what arguments to include, and exclude, in order to appeal to their ideal readers, and they mediate the discourse to reflect what they consider to be the prevailing and accepted views of their readership (Fairclough, 2015). Moreover, when writing about CAM, journalists often turn to their 'trusted sources in the biomedical community', which can produce a 'biomedical bias' and 'a degree of skepticism rare for medical reporting' (Bublea at el 2008, p. 40). Some claim that it is not possible to establish the direct impact of Colquhoun's campaign on the courses *'*because there were other factors at play at the time*'* (Chatfield *et al.,* 2012, p. 16). However, Colquhoun himself is convinced that he played a significant part in the downfall of 'quackademia' (Colquhoun, 2013).

Method

The aim of the current study was to examine the mass media delegitimation of university level homeopathy education in the UK. The focus of the study was to determine which of Colquhoun's arguments were reproduced by the media, as well as the themes that occurred in the media coverage of the campaign, in order to shed light on the aspects of the homeopathy debate media producers considered to be relevant, and of interest, to their readership. As such, rather than studying material from the blogs of Colquhoun and other skeptics, this study is based on an analysis of media items from the UK published between 1998, when homeopathy degrees first started, and the end of 2015, when the current study was conducted. Unlike the coverage of the climategate scandal, where a sizable number of media items were written by scientists themselves (Ramírez-I-Ollé, 2015), the vast majority of articles about homeopathy degrees were written by professional journalists. As Colquhoun himself points out, CAM has been *'criticised very openly by journalists who are not scientists, but who write mainly on politics and economics and who are widely read and respected'* (Colquhoun 2008b, p. 13).

The media database *Proquest International Newsstand* was used to search for media items relating to the homeopathy degrees in the UK. At the time of searching, the database contained full-text content from 832 regional and national newspapers from around the world. Two separate searches were conducted. The first search was carried out in December 2015 and used the search terms: "BSc" and "Homoeopathy", which yielded 144 results. These were then narrowed by removing international publications, duplicates and results that did not mention homeopathy degrees in the UK, to give 42 results. A second search was carried out in January 2016, using the search terms "homeopathy" and "degree". This broader search yielded 774 results and after removing international titles, duplicates and irrelevant items a further 23 items were added to the data set, giving a total data set of 65 items for analysis (see Table 1).

Table 1: Summary of media items

	Broadsheet (including former broadsheet) newspapers	**Tabloid newspapers**		**Trade magazines**	**News Magazines**	**Total**
		Middle market	**Red-top**			
News articles	14	4	0	8	0	**26**
Comment pieces	7	1	0	4	0	**12**
Feature articles	12	2	1	1	1	**17**
Correspondence	3	5	0	2	0	**10**
Total	**36**	**12**	**1**	**15**	**1**	**65**

The texts in the dataset were analysed using a mixed methods approach (Johnson, Onwuegbuzie, & Turner, 2007). First, the media items were listed in a spreadsheet with their publication details, and counts of the year of publication and the publication type were performed. Then the text of the 65 items was read and classified according to whether the overall stance in the piece towards the BSc in homeopathy was positive, neutral or negative. Following this, a thematic analysis was carried out to identify the arguments that were contained in the media items.

From the initial read, 44 initial codes were generated relating to arguments for or against homeopathy degrees as well as textual features of descriptions of homeopathy, CAM, science and scientists. These initial codes were then reviewed to identify recurring themes and to establish the final set of 24 codes for analysis (see Braun & Clarke, 2006). The data set was then read again and coded using the finalised coding framework. A total of 514 coding decisions were made from reading the 65 items, and quotations relating to these coding decisions were compiled into a spreadsheet. Frequency counts of the number of times a particular argument or strategy was used per year, and by each publication, were carried out to determine patterns of coverage across the data set. Quotes from media items in the dataset, used as illustrative examples in the following discussion, are denoted by superscript numbers and correspond to the listing in the Appendix table.

A campaign gains momentum: media discourse on homeopathy education from 1998 to 2015

The debate over the BSc homeopathy encapsulates the broader shift in public opinion towards homeopathy in general over the study period, and the change in attitude is clearly illustrated in the data set (see Figure 1). Prior to 2007, the reports are either neutral or positive towards the BSc in homeopathy, but from 2007 onwards the degrees attract mostly negative coverage. Following Colquhoun's (2007) Nature article, the nature of the coverage of the homeopathy degrees changed and became more critical (see Figure 1). Articles in *Nature* have a high degree of impact in the mass media, as prior to publication journalists are given press releases of papers of particular interest as well as access to the full text of all papers to be published (Nature, 2016). This gives them an opportunity to contact authors for comment and prepare articles, which are then published on the same day as the *Nature* issue. All five of the newspaper articles published on the same day as the *Nature* article reproduced Colquhoun's arguments on the BSc homeopathy and presented overall either a neutral or negative stance to the degrees. The following discussion will explore the arguments against homeopathy degrees, which originated from scientists and were propagated by the media.

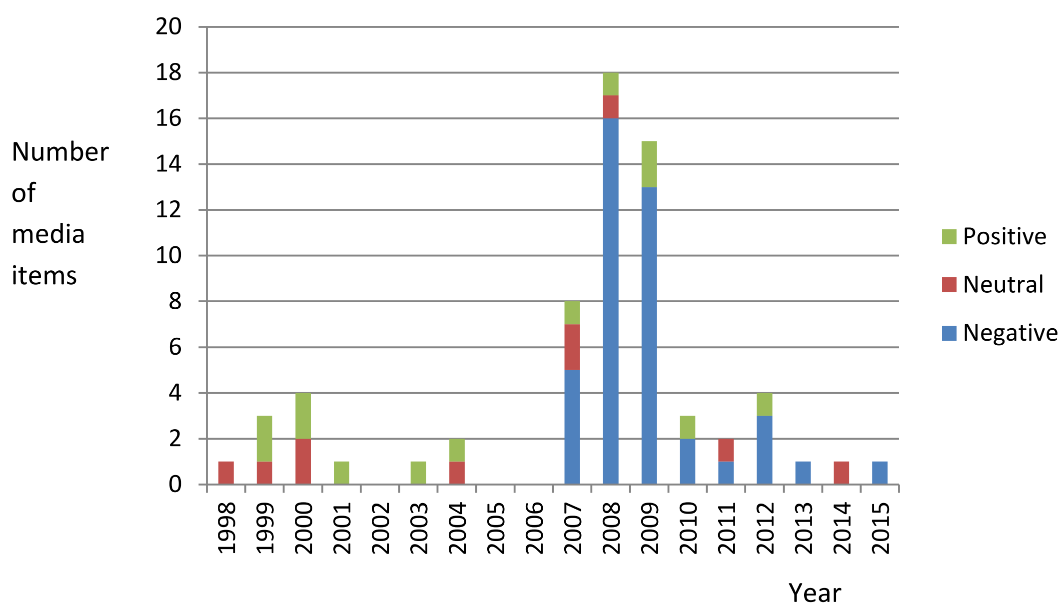

Figure 1: Attitudes within media items to the BScs in Homeopathy (1998-2015)

Profiting from homeopathy: the new university Other

As Hess (1993) found, the rhetoric of the debate over homeopathy degrees was firmly entrenched in the culture where it was located. A key strategy used by Colquhoun, and the journalists that disseminated his arguments, was to connect the BSc in homeopathy to a number of negative concepts associated with higher education in the UK that readers of the quality press would already be familiar with. Following Colquhoun's (2007) Nature article, readers were reminded that the 'former polytechnics'[13] were 'less research focused'[35] and were also referred to as 'minor'[36] and 'third-rate'[59], despite making up two thirds of the university sector. From 2007 onwards, 11 media items also directly associated the BSc Homeopathy with 'Mickey Mouse' degrees.

As Leathwood and O'Connell (2003) point out there has been a clear denigration of new universities in the British media and by putting homeopathy together with these negatively viewed institutions, an undesirable Other is constructed in the mind of the reader. This new university Other is juxtaposed by the image projected of Colquhoun, who is depicted as a 'rational hero'[63], an 'indefatigable quackbuster'[28] and who describes himself as 'a senior scientist in one of Britain's biggest and most respected universities'[60]. Colquhoun also maintains that, 'the true villains of the piece … are the vice-chancellors'[60] of the universities that teach homeopathy, rather than homeopaths themselves.

An important charge against the new universities was their eagerness to capitalize on the popularity of CAM, at the expense of academic integrity. In a similar manner to the denunciations of New Age authors in Hess'(1993) study and the cold fusion scientists studied by Gieryn (1999), the pursuit of profit is pitted against academic rigour. Of the 19 instances of this argument, only one occurs before Coquhoun's (2007) Nature article. The universities were described as: 'smart enough know that magic is a way to make money'[14], and were accused being 'greedy shysters'[59], of 'flogging degrees in witchcraft'[22], 'seeing the courses as cash cows '[35], having 'a "bums-on-seats" financial interest'[35]. The most frequent use of this argument occurred in the *Times Higher Education* magazine, which is widely read by those in the university sector. It seems that readers of this publication, whether they worked at a new university or not, were expected to understand that the pursuit of profit was something that 'no respectable university'[34] should be undertaking.

The condemnation of profit making by new universities became a key theme in the media from 2007 onwards, but following that, in 2008 another device was also used (see Figure 2). Readers were reminded that, ultimately, it was they as taxpayers who were footing the bill for these 'rip off'[59] degrees: 'Just remember: you're paying for this voodoo science to be taught in a British university'[20]. This argument appears in the media items following the publication in August 2007 of a report by the British pressure group, the TaxPayers' Alliance, which cited Colquhoun's (2007) Nature article and listed homeopathy and other CAM degrees in its list of 'non-courses'. The accusation of wasting of tax payers money has been used by both sides of the debate over the regulation of CAM, with skeptics considering regulation to be a misuse of public funds and CAM supporters claiming that by not using CAM, the NHS is wasting money (see Wahlberg, 2015). As Hess (1993) found, it is not uncommon for the same strategy to be used by both sides of scientific controversies.

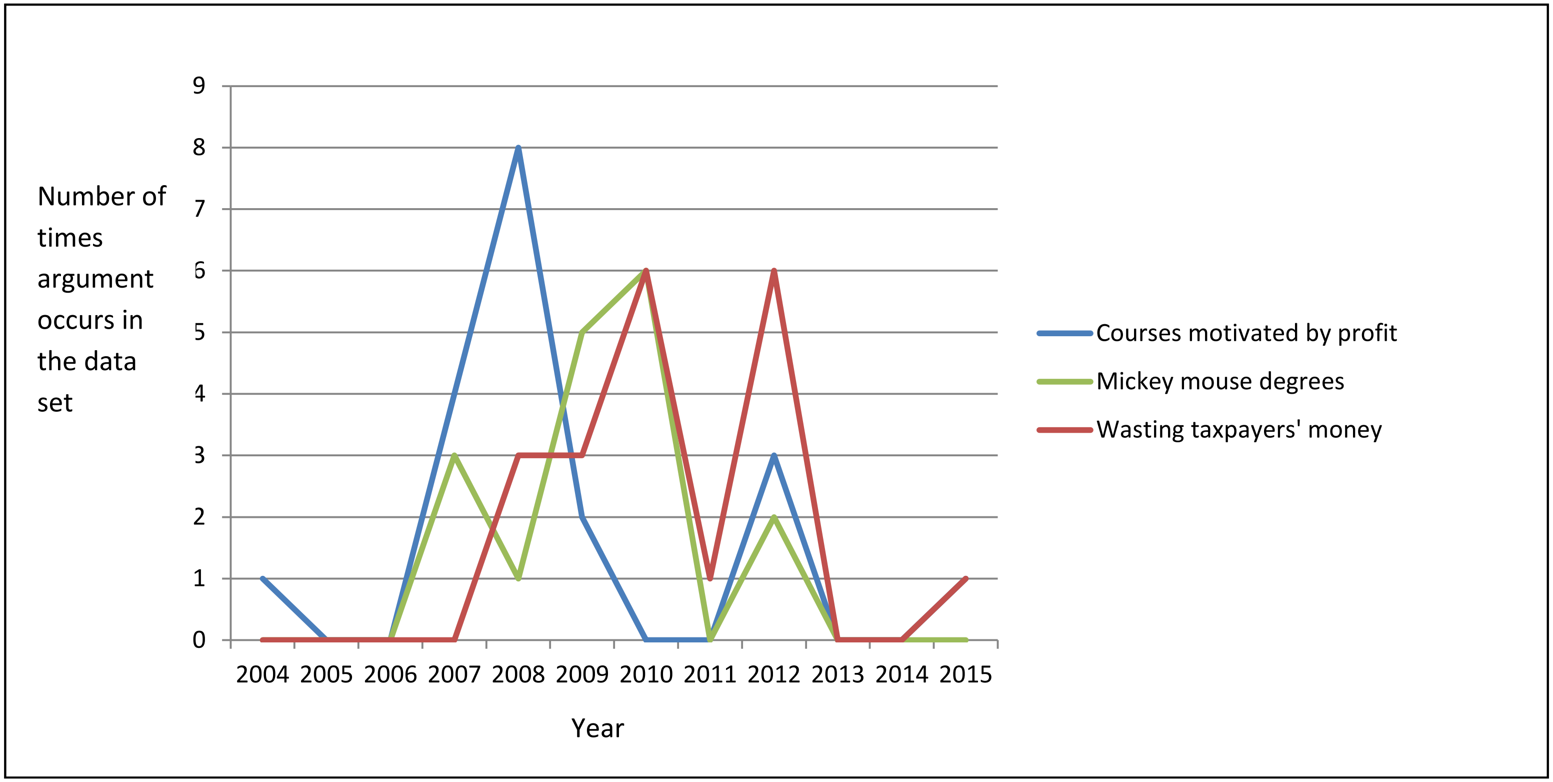

Figure 2: Frequency of arguments criticizing universities that ran homeopathy degrees (2004-2015)

Religion, magic and ridicule

Colquhoun was at pains to point out that the homeopathy BSc is worse than a Mickey Mouse degree 'because the underlying subject matter was founded on faith, not science'[13]. This is an argument that appears, and is utilised, during the period 2007-2010, when homeopathy was described as 'much more like religion than science'[16], proponents of CAM were described as 'believers'[53] and students on CAM courses were 'unsuspecting victims of brainwashing'[42]. This use of metaphors associated with religion, and even religious cults, echoes the findings of Nerlich, (2010) and Hess (1993), who also found that the accusation of being a 'believer' is used as a rhetorical strategy to delegitimize opponents and to imply 'a level of gullibility that violates … common sense' (Hess, 1993, p. 63).

The news items not only used references to religion to make the distinction between science and homeopathy, but went one step further and used magical imagery. Homeopathy was 'risible witchcraft'[22], homeopathic remedies were 'potions'[21] and homeopaths were 'the nation's chief peddlers of mumbo jumbo'[22]. Institutions that ran the BSc in homeopathy, were accused of 'promoting myths and magic'[17] and 'might just as well be offering BSc courses in witchcraft or astrology'[45]. The creative use of magical imagery by commentators was not simply disparaging homeopathy, but was also used to ridicule it. For example, Colquhoun created a much reproduced satirical guide to CAM, which was titled 'Mumbo-jumbo and Barmpots: A glossary of Magic Medicine'[45], where homeopathy is described as 'giving patients no medicine whatsoever'[45]. Parallels can be drawn between Colquhoun's Glossary and Gardner's comic descriptions of New Age gurus, and it is clear that the use of ridicule 'further discredits the ... Other' (Hess 1993, p. 64).

Combined with this use of ridicule was a strategy to name and shame those involved in the homeopathy degrees. The University of Westminster, which ran the largest number of CAM degree courses, was named 31 times in the data set, with 77% of these instances being negative associations. Westminster was accused of selling 'a degree in reading tea-leaves'[22], and lecture notes and exam papers from CAM degrees at Westminster were also used to ridicule the courses in two separate articles, including one in the *Times Higher Education* magazine. Not only were universities named, but vice-chancellors were also personally targeted. As one commentator explained: 'Vice-chancellors don't like it when Googling their names produces references to "yin energy"'[61].

Efficacy, plausibility and accreditation

Despite the view of government that regulation is about protecting the public, rather than whether therapies work, in recent years the debate about the scientific legitimacy of homeopathy has become increasingly important to its survival. For homeopathy, this rests on whether a remedy that contains no active substance could have a therapeutic effect. To Colquhoun it was clear: homeopathy contains no active ingredients and is therefore 'grossly irrational, deeply implausible'[28] and 'the most obvious delusion'[17]. His point was reproduced in four separate media items, and by 2012, the label had stuck: 'Homoeopathy (the medicine that contains no medicine)'[61]. Interestingly, Colquhoun steers clear of the debate over clinical efficacy and evidence from clinical trials for homeopathy and instead attacks other aspects, such as his claim that it has 'barely changed since the beginning of the 19th century'[14].

Homeopathy was also repeatedly described by scientists quoted in the media as non-science, unscientific, pseudoscience or even anti-science. This was a complete change to the discourse prior to 2007, where CAM degrees were considered a positive contribution to ensuring better training for practitioners, enhanced patient safety and much-needed research into CAM therapies. By 2011, seemingly, the argument against universities running degrees in homeopathy and CAM had been won and in the 10 items published after 2010, none gave the arguments in favour of CAM being taught in universities (see Figure 3).

As the tide turned against homeopathy, not only were the arguments for better training and patient safety no longer advanced, but the accepted line on the relationship between CAM and evidence also changed. In early articles, journalists reported the fact that there was still a debate over the evidence base for CAM, and a number of articles included the view of CAM supporters, that it was just a case of carrying enough research and efficacy would surely be demonstrated. However, by 2012, in two separate media items in the data set, CAM is stated as 'non-evidence based'[59/61] medicine with no qualification or modality to indicate the debates surrounding the CAM knowledge base. It was clear that there had been a change in the perception of journalists and their imagined ideal readers about the legitimacy of evidence for CAM.

Not only did journalists and readers change their views about the CAM knowledge base, but the government's position on evidence also seems to have changed. Despite the government's stance originally being that regulation was about protecting the public and not about evidence, a recent report has recommended overturning the decision for herbal medicine to be statutorily regulated and to put in place a requirement for therapies to produce evidence of efficacy and data about safety risks (Walker, 2015). The issue for CAM therapies now is that it is unlikely that this research will be produced without the support of universities. However, universities fear of a significant public relations storm should they be in any way associated with supporting homeopathy and are now reluctant to run courses in therapies that are not statutorily regulated (University of Central Lancashire, 2009). This double bind has effectively ensured the expulsion of homeopathy from universities in the UK, and it is now the case that to be taught as a science in a university, a therapy must have both evidence of clinical legitimacy, and scientific plausibility at the cellular level. As Gieryn (1999, p.13) argues, losers in boundary work 'see their claims moved out from fact to illusion, lie, ulterior motive, or faith while they (and their methods, practices, organisations, and institutions) get marginalised or excluded fully from the domain of epistemic authority reserved for science and its genuinely licenced practitioners.'

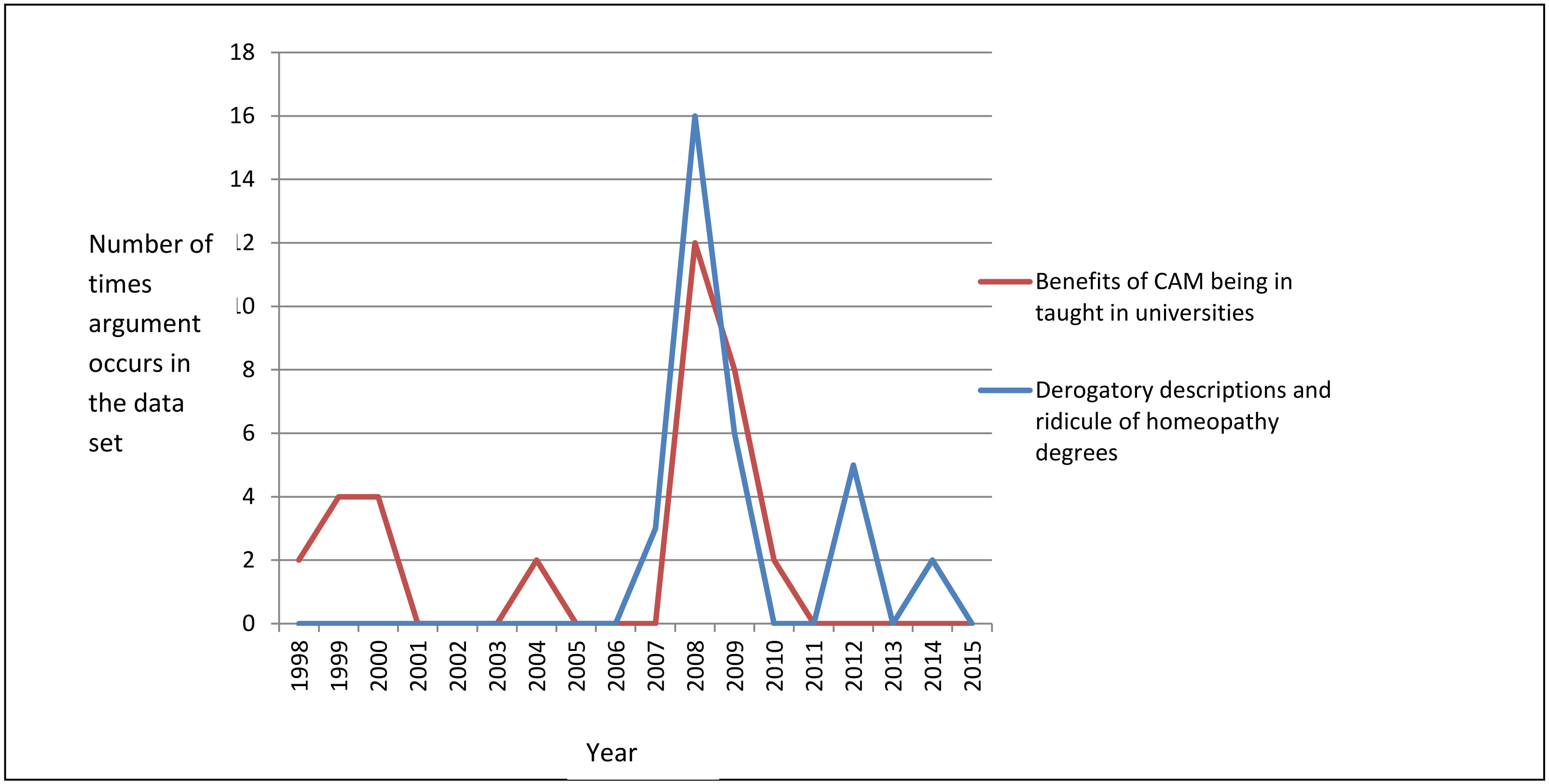

Figure 3: Change in reports of the benefits of CAM degrees and the derogatory descriptions and ridicule of homeopathy degrees (1998-2015).

Fairclough (2015, p. 80) suggests that the media give prominence to certain perspectives and sources and 'the favoured interpretations and wordings are those of the power-holders in our society, though they appear to be just those of the newspaper'. From the coverage of the campaign against homeopathy degrees, it is clear that scientists hold more power than CAM users, CAM students or CAM lecturers. In the 53 media items published after Colquhoun's (2007) Nature article, there is not a single quote from a homeopathy student, despite the fact they were the ones directly affected by the demise of their degree. As MacArtney and Wahlberg (2014, p. 115) point out, arguments by critics 'often included assertions (both explicit and implicit) about the people who use CAM'. For example, one commentator in the current data set described CAM users as follows: 'If we exclude immigrants, who have their own useless remedies, the major consumers of CAM are ladies who lunch"[59]. The views of CAM users, students, and CAM lecturers are all underrepresented in the media items in this study and it would be an interesting topic for further research to explore their views on the events that took place, as well as on the new landscape in which CAM finds itself.

Preserving autonomy and *protecting science*

It was not only CAM supporters who were the driving force behind the creation of homeopathy degrees. There was also significant support from government, in order to protect the public from poorly trained practitioners. As Saks (1994:91) points out, 'politicians and the State can wield a crucial influence over the outcome of events in the face of a significant level of consumer demand'. The campaign from Colquhoun and others can be also seen as resisting this state level interference in what should be taught as science. One commentator in the current data set argued that 'governments must not abandon the palisades that protect proven science from the world of superstition'[22]. As such, this strategy to protect the boundaries of science from being redrawn either by fringe medical practitioners or those in government corresponds to Gieryn's (1999) third type of boundary work, the protection of the autonomy of science from outsiders.

Originally, one of Colquhoun's key arguments in the campaign was that homeopathy had no place being a Bachelor of Science degree. The use of the Bachelor of Science title was described as a 'misuse'[27], a 'contradiction in terms'[54], 'dubious'[18], 'wrong'[42], 'dishonest'[13] and 'offensive'[42]. The fact that Colquhoun is a scientist and not a medical doctor is interesting as CAM is usually considered to be a threat to the dominance of the medical profession, rather than science and scientists. However, Colquhoun and his supporters clearly felt the need to defend science from imposters and including homeopathy as a Bachelor of Science was said to be an 'insult to scientific inquiry'[18] and a 'diluting'[34] and 'undermining'[13], which 'degrades the whole of science'[29]. When a number of commentators queried whether the whole debate could be quashed by changing the homeopathy course to a Bachelor of Arts degree, Colquhoun's argument evolved into CAM not being suitable for study in a university, whatever the degree might be called. The courses were accused of giving CAM and homeopathy an 'academic respectability'[65] that was undeserved and were said to 'embarrass the academic community'[46] and be 'besmirching the reputation of British university education'[23].

The fact that the campaign against CAM degrees was spearheaded by a prominent scientist in the pages of Britain's leading science journal reveals the positioning of the boundary between science and medicine in this case. It is clear that Colquhoun, described as someone who has 'never touched a patient in their life'[35] felt that it was appropriate to campaign about an issue in medical education. As such, this implies that here the boundary between medicine and science was decidedly blurred. It was not enough to brand homeopathy as non-science, but allow it to continue as part of medical education. If medicine and science were effectively a single entity, then homeopathy had to be purged from medicine too, in order to 'exonerate that community of any future criticism' (Kristeva, 1996, p. 392, cited in Traynor 2000, p. 143). In effect, the two professions, science and medicine, were acting as allies; the incursion of complementary and alternative therapies into medicine was something that scientists felt they must respond to, in order to preserve both the alliance and their own status and security.

Conclusion

University degrees in homeopathy were created to address concerns from government about the quality of training of non-medically qualified complementary and alternative medicine practitioners. However, prominent scientists such as Professor Colquhoun waged a vigorous media campaign that maligned the legitimacy of teaching homeopathy as a Bachelor of Science degree. All undergraduate homeopathy degrees taught in universities were eventually closed and homeopathy was expelled from the academy. The current study has examined the boundary work carried out during the campaign and has revealed a number of strategies that were used to segregate homeopathy from both science and medicine.

One prominent strategy in the boundary work was to employ metaphors from a range of fields, and contrast science with homeopathy by associating the latter with profit, belief and magic. Previous studies of boundary work have also found that metaphors from the fields of business and religion have been used to make clear the distinction between science and non-science (Hess 1993, Gieryn 1999, Nerlich, 2010). However, in contrast to these previous studies, Colquhoun's campaign also used metaphors relating to the field of UK Higher Education, such as pitting heroic scientists against the alleged unscrupulous vice-chancellors of new universities and associating homeopathy with Mickey Mouse degrees. It seems, therefore, that binary oppositions from almost any field can be used to illustrate the division between science and non-science.

Another important strategy in the boundary work was to shift homeopathy from the province of medicine, to that of science, as stronger basis to delegitimise it. In medicine, the clinical effectiveness of a treatment is often considered more important than understanding its mode of action in scientific terms. However, decisively demonstrating efficacy can be complicated and CAM critics have had little success in delegitimizing CAM in the minds of the public through debates over the methodologies of clinical trials on the pages of medical journals. In contrast, Colquhoun's media campaign against homeopathy degrees focused on the scientific plausibility of homeopathy as a strategy to undermine it. Homeopathy has suffered from accusations of impossibility since the rise of biomedicine, but Colquhoun managed to distill the argument into an irreverent slogan which has proven difficult to shake off: 'Homoeopathy (the medicine that contains no medicine)'[61].

Colquhoun's focus on plausibility can also be argued to represent a shift in the discourse on CAM from a focus on therapeutic efficacy to a focus on therapeutic agents. This change in discourse has had profound consequences for CAM and its place in the structures of British society. Before the demolition of homeopathy's scientific credibility, accreditation and regulation were not linked to either the plausibility of a therapy or evidence for efficacy of treatments. However, following the shift in focus onto the plausibility of the therapeutic agent rather than its efficacy, both accreditation and regulation of therapies are now bound to scientific credibility as universities are reluctant to run courses in therapies that are not statutorily regulated and statutory regulation now requires a therapy to be supported by increased amounts of scientific data, which is increasingly difficult to gather for therapies with scientifically implausible therapeutic agents.

It is clear from the campaign against homeopathy degrees, that medical education is one place where the 'explicit articulation' of the boundaries of science occurs (Gieryn, 1999, p. 405). Not only was a distinction drawn between science and homeopathy (non-science), but the campaign against homeopathy degrees also revealed where prominent academic scientists, such as Colquhoun, saw the boundary between science and medicine. It appears that in this case, this boundary was distinctly porous as scientists felt compelled to intercede in medical education. Previous studies of boundary work in CAM have shown that medical professionals have followed a policy of expanding their practice to incorporate selected aspects of CAM (Adams, 2005, Hess 2004). However, this study demonstrates that Colquhoun and supporters instead sought to expel CAM, and homeopathy in particular, from both medicine and science.

This case provides an example of scientists intervening in the affairs of another profession, namely medicine. As such, it demonstrates that boundary work can occur not only by scientists to demarcate the borders of science, but also to define the boundaries of other allied professions as a strategy to ultimately protect science. Just as modern unions between states influence geographic maps, it seems that alliances between professions can shape cultural landscapes and that boundary work can be done by one profession, on behalf of an ally. As such, this case demonstrates that the cartographic lexicon of boundary work, of 'borders, territories, labeled landmarks, scale and coordinates' (Gieryn, 1999, p.29), must expand to include imagery of alliances and coalitions.

The success of the campaign against homeopathy degrees has inspired many of the prominent sceptics, Colquhoun included, to turn their attention to the rest of CAM (Colquhoun, 2008a). However, other CAM therapies have different degrees of scientific and clinical legitimacy, which could influence the outcomes of sceptical campaigns against them (Baer, 1987). In addition, the campaign against the Homeopathy BScs has inspired attempts in other countries to limit CAM degree courses. Colquhoun is part of an Australian campaign group to end CAM courses in universities there (Gooch, 2012) and proposed homeopathy degrees in Germany were withdrawn in order to prevent 'the consecration of pseudoscience' (Henderson, 2014). The trajectory of the Australian campaign against CAM in universities will provide an interesting international comparison that could shed light on the influence of different cultural factors and regulatory structures in the success or failure of CAM in society.

Acknowledgements

I would like to thank Alison Denham for suggesting that I research CAM education and Dr Midge Whitelegg for introducing me to the discipline from which to do so. I would also like to thank Dr Bernard Gallagher for encouraging me to write this article and I am grateful to the editors of *Science as Culture*, and the two anonymous reviewers, for their insightful comments on the manuscript. This study received no specific grant from any funding agency in the public, non-for-profit or commercial sectors.

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Appendix Table: Media Items analysed in the study

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