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Why is the Diagnostic and Statistical Manual of Mental Disorders so hard to revise? Path-dependence and "lock-in" in classification.

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Abstract

The latest edition of the Diagnostic and Statistical Manual of Mental Disorders, the D.S.M.-5, was published in May 2013. In the lead up to publication, radical changes to the classification were anticipated; there was widespread dissatisfaction with the previous edition and it was accepted that a "paradigm shift" was required. In the end, however, and despite huge efforts at revision, the published D.S.M.-5 differs very little from its predecessor. This paper considers why it is that revising the D.S.M. has become so difficult. The D.S.M. is such an important classification that this question is worth asking in its own right. The case of the D.S.M. can also serve as a study for considering stasis in classification more broadly; why and how can classifications become resistant to change? I suggest that classifications like the D.S.M. can be thought of as forming part of the infrastructure of science, and have much in common with material infrastructure. In particular, as with material technologies, it is possible for "path dependent" development to cause a sub-optimal classification to become "locked in" and hard to replace.

Highlights:

- Despite commitment to radical revision, D.S.M.-5 differs little from its predecessor.
- As the D.S.M.-5 is agreed to be sub-optimal this will hold back research.
- Path-dependence has led to the classification becoming "locked-in".
- "Lock-in" is time-dependent and agent-relative and may be overcome in the future.

The Diagnostic and Statistical Manual of Mental Disorders (more commonly known as the D.S.M.) is a classification of mental disorders published by the American Psychiatric Association (A.P.A.). The D.S.M. is hugely influential and used throughout the world. The latest edition, D.S.M.-5, was published in May 2013. In the lead up to publication, radical changes to the classification were anticipated; there was widespread dissatisfaction with the previous edition and the A.P.A. had acknowledged that a "paradigm shift" might be required (Kupfer et al, 2002, p.xix). In the end, however, and despite huge efforts at revision, the published D.S.M.-5 differs very little from its predecessor. This paper considers why it is that revising the D.S.M. has become so difficult. The D.S.M. is such an important classification that this question is worth addressing in its own right. The case of the D.S.M. can also serve as a study for considering stasis in classification more broadly; why and how can classifications become resistant to change?

In *Sorting Things Out* (2000), Bowker and Star argue that classifications can be thought of as part of the information infrastructure of science, and have features in common with material infrastructure, like electricity supply networks. They suggest that as with material technologies, it is possible for "path dependent" development to cause a sub-optimal classification to become "locked in" and hard to replace (Bowker and Star, 2000, p.14). Drawing on this suggestion, I will show that the D.S.M. has come to suffer from "lock-in", and that more generally widely-used classification systems are prone to lock-in. I finish by discussing the problems that lock-in causes and consider the prospects for lock-in being overcome (in particular by a new classification for mental health research, RDoC, currently being developed by the U.S. National Institute of Mental Health).

1. The D.S.M. in use and under revision

The D.S.M. is a large and expensive book that provides diagnostic criteria for each commonly seen psychiatric disorder. Alcohol Intoxication, for example, is to be diagnosed when a certain number of characteristic symptoms (slurred speech, unsteady gait, impairment in attention or memory, and so on) follow "recent ingestion of alcohol" (A.P.A., 2013, p.497). For Persistent Depressive Disorder symptoms can include problems with appetite and sleep, fatigue, low self-esteem, poor concentration, and feelings of hopelessness (A.P.A., 2013, p.168-9).

The D.S.M. provides a common language for mental health research, policy and care. Almost all papers published in psychiatric journals refer to the D.S.M.; the use of D.S.M. categories to select subject populations for study is near universal. Worldwide, textbooks for mental health professionals, and treatment guidelines, tend to be structured around D.S.M. categories. In the U.S., the D.S.M. also plays an important bureaucratic and economic role; in particular, the D.S.M. contains the codes that insurers commonly require before paying for mental health treatment.

Although currently widely used, the D.S.M. has only become important relatively recently (Cooper 2005, Decker 2013, Shorter 2013). The earliest editions of the D.S.M., published in 1952 and 1968 were slim, cheap, and little read. The D.S.M. series only came to global prominence with the publication of D.S.M.-III in 1980. The D.S.M.-III was a big book, with diagnostic categories suited to patients seen in counsellors' offices as well as in mental hospitals. In the U.S., the disorder codes included in the D.S.M. came to be used in filling in the forms for claiming medical insurance, and sales of the classification took off. Since the D.S.M.-III, each later edition, D.S.M.-III-R in 1987, D.S.M.-IV in 1994, D.S.M.-IV-TR in 2000 (with the "R" standing for "revision" and the "TR" for "text revision") - further helped to consolidate the system's position as the most important classification of mental disorders.[1]

Work on the D.S.M.-5 took twelve years and involved many hundreds of people (American Psychiatric Association, 2013, p.5). In 1999, an initial conference, published as *A Research*

[1] The D.S.M.-IV-TR (2000) was only a "text revision", that is the sets of diagnostic criteria remained the same as in the D.S.M.-IV (with a very few exceptions), and only the accompanying text was revised.

The World Health Organisation (W.H.O.) publishes the *International Classification of Disorders* (I.C.D.), which supplies codes for official health statistics for the whole of medicine. The I.C.D. includes a chapter dedicated to "Mental and Behavioural Disorders". However, at present, after much work on alignment by the A.P.A. and the W.H.O., the I.C.D. and D.S.M. can scarcely count as independent classifications of mental disorders. The mental disorders section of the forthcoming I.C.D.-11 is expected to be much the same as the D.S.M.-5. A statement from the A.P.A. explains the relationship between the two classifications: "DSM-5 and the ICD should be thought of as companion publications. DSM-5 contains the most up-to-date criteria for diagnosing mental disorders, along with extensive descriptive text, providing a common language for clinicians to communicate about their patients. The ICD contains the code numbers used in DSM-5 and all of medicine, needed for insurance reimbursement and for monitoring of morbidity and mortality statistics by national and international health agencies. The APA works closely with staff from the WHO, CMS, and CDC-NCHS to ensure that the two systems are maximally compatible." (A.P.A., 2013b)

Agenda for D.S.M.-V (the Latin numerals only changed later) (Kupfer et al., 2002), set out the hopes for D.S.M. revision. *A Research Agenda* begins by detailing problems with the D.S.M. series to date. It notes that the D.S.M.-IV fails to neatly classify patients – rather than each patient fitting one category, a great number fit multiple categories (the problem of co-morbidity) or none (and have to be given a "diagnosis" of "Not Otherwise Specified"). Furthermore, research projects aiming to find the biological mechanisms underpinning disorder have achieved little; genes for schizophrenia, or anything else, remain elusive. *A Research Agenda* concludes that this lack of progress may indicate that the D.S.M.-IV fails to divide up the domain of mental disorders in the way that would best promote science; rather than circumscribing natural kinds, the diagnostic criteria of the D.S.M.-IV might merely arbitrarily group certain patients together.

A Research Agenda traces the root of the problem to the descriptive approach to classification adopted by the D.S.M.-III. When the D.S.M.-III was under development, in the late seventies, psychoanalysis remained an important perspective in U.S. psychiatry, and psychoanalytically and biologically-inclined psychiatrists could reach agreement on little. To keep all parties on board, the D.S.M.-III sought to be a purely descriptive classification that made no use of unproven theoretical assumptions (A.P.A., 1980, pp.6-8). The descriptive syndromes of the D.S.M.-III were selected primarily to ensure reliability (i.e. agreement between diagnosing clinicians) rather than validity (i.e fit with the natural structure of mental disorders). The thought at the time was that a classification that could at least be reliably applied would enable research that would allow the categories to be revised over time to better reflect the nature of mental disorders. But now biologically-orientated researchers wondered whether the descriptive approach of the D.S.M.-III might have outlived its usefulness, and whether important commonalities between cases of disorder might not be apparent at the level of surface symptoms. Maybe only a classification based on common causal origins would enable progress in mental health research. A key theme of *A Research Agenda* is that the descriptive syndromes included in the D.S.M. have now become so embedded in psychiatric research as to be potentially problematic. It increasingly seems likely that some theoretically interesting populations do not map on to D.S.M. categories, and such groups are currently under-researched. If, for example, some sub-group of those with a particular D.S.M. diagnosis share a genetic abnormality, or a drug can help a population that cuts across current categories, this is likely to be missed by current investigations. In a *Research Agenda* there is much talk of the need for paradigm change, and plans are set out for moving towards more

biologically-based and more dimensional approaches to classifying psychopathology.

Work on drafting the D.S.M.-5 began in earnest in 2006. As publishers of the D.S.M., the A.P.A. controls the revision process (detailed in A.P.A., 2013, *Introduction*). A Task Force of twenty-eight, chaired by David Kupfer, was appointed to oversee the project. Each section of the manual - mood disorders, childhood disorders, and so on –was reviewed by an associated work group of about ten experts. Members of the work groups reviewed the literature published since the publication of D.S.M.-IV and considered where the classification might be in need of updating. They presented their ideas in papers and at conferences to gather feedback. Draft proposals for changes to the D.S.M. diagnostic criteria were posted online, and all were invited to comment. Some of the new diagnostic criteria sets were tested in field trials, where clinicians used the draft criteria to check that they could be understood and used in practice. Behind the scenes, groups of patients and clinicians, and others with interests in the D.S.M., lobbied the A.P.A. in attempts to shape the classification. Finally, before publication, the D.S.M. had to be voted through by various A.P.A committees.

Although the committees revising the D.S.M. started out with ambitions for radical changes, over time, one-by-one, the more radical suggestions for overhaul were dropped. David Kupfer who chaired the Task Force to revise the D.S.M.-5 describes it as "an aggressive, conservative document", in his view the committees were aggressive in their pursuit of revision, but conservative in their decisions in the end (Levine, 2013). In its finally published form the D.S.M.-5 differs from its predecessor much less than originally envisaged; a few disorders have been added, a few disorders have been removed, diagnostic criteria have been tweaked here and there. This paper examines why the D.S.M. proved so difficult to change. How is that a revision process that cost $25 million (Frances, 2013, p.175), and that involved so much work by so many experts, achieved so little? How could the A.P.A. set out to make changes, and yet fail to change its own manual?

At the outset it is worth acknowledging that the reasons why proposed revisions didn't make it to the final version are multiple. It's always to be expected that many proposals will flounder as their details are worked out; many ideas that look good in outline run into difficulties when developed further. In addition, there have been suggestions that the revision process was mismanaged (Frances, 2013; Greenberg, 2013). Although much money and effort was spent, important deadlines were repeatedly missed, internal politics may have resulted in key experts being excluded from the process, and some committee members have

suggested that they suffered from a lack of direction. Whether allegations that the revision process was poorly managed are justified is hard to assess; the nitty-gritty details of the ways in which the D.S.M.-5 was constructed are at present known only to committee members, and they have signed agreements not to discuss their efforts (Board of Trustees, 2007). In any case, here I suggest that a more fundamental, general explanation of why the D.S.M. is now hard to revise can be found, through employing the concepts of "path dependence" and "lock-in".

2. "Path dependence" and "lock-in"

The QWERTY keyboard layout offers the classic example of path dependence leading to lock-in (David, 1985). In the days of mechanical typewriters, the QWERTY layout was designed to reduce the chances of keys jamming together; the design minimises the frequency with which physically adjacent keys are used one after the other. Modern keyboards no longer jam, and so it may well be the case that a different layout would be preferable. Many argue that an alternative layout, Dvorak, would enable faster typing. Still, the costs of shifting from one layout to another are too great for QWERTY to now be displaced. Everyone finds it easier to type on keyboards that have a familiar layout, and so everyone buys QWERTY keyboards. The QWERTY design has become locked-in.

The QWERTY example is somewhat controversial (Liebowitz and Margolis, 1990, contest the supposed superiority of Dvorak), but will still serve to illustrate the idea that certain technologies are path dependent, and can become locked-in to suboptimal design. The phenomenon arises as follows: At an initial time a particular technology comes to be adopted either because it has some temporary advantage over competitors, or through chance factors. The technology is such that success breeds success, such that, at some later point, the adopted technology becomes very hard to dislodge. Path dependence, potentially leading to lock-in, can occur whenever a technology is such that positive feedback mechanisms ensure that its greater use brings ever greater returns. The QWERTY keyboard layout manifests path dependence because the more used typists become to working with a particular layout the harder and harder it becomes to change.

Another classic example of path dependence leading to lock-in illustrates the effects of a different type of positive feedback mechanism.[2] When home video players were first developed V.H.S. quickly came to be the preferred format (Arthur, 1990). Arguably a different technology, Betamax, would have been better, but once V.H.S. was in widespread use it could not be dislodged. With a technology of this type it is an advantage for each individual user to employ a format that is widely used by others. One needs videos to play in video-recorders, and more videos are available (from friends, from hire shops) in the most used format. As such, once a large number of people use a particular option, new buyers will also choose this. One way in which path dependence can occur is when technologies are tied in with supporting infrastructures, such that an individual cannot simply choose to switch to a competitor.

As the V.H.S.-Betamax example makes clear, lock-in is not an absolute matter. The dominance of V.H.S. did not last, nowadays the technology is near-obsolete, and D.V.D.s or downloaded films have become the norm. Lock-in is a time-dependent and agent-relative matter. New technology or social changes can make it the case that a technology that is locked-in now might not be in the future. Take the QWERTY keyboard. Suppose that voice recognition software becomes the norm such that typing becomes a much rarer activity. In such a world, where no-one can touch type in any case, customers might become willing to buy an alternative keyboard layout. It's also the case that what's impossible for one agent, may be possible for another. In the U.K., we drive on the left. From the point of view of an individual driver going against this norm is impossible. But from the point of view of the government, driving on the left is a convention that might be revised; although switching has great costs, other countries have switched from left to right hand driving.

In the following section I shall suggest that the D.S.M. has become locked-in in two senses. First, it's become very difficult for any other professional body comparable to the A.P.A. (the American Psychological Association, say, or national organisations of social workers or counsellors) to produce a competitor to the D.S.M. Second, the D.S.M. has become locked-in such that it's become very difficult even for the A.P.A., its publishers, to radically revise it.

[2] Other case studies of lock-in have examined the design of British rail coal wagons (Scott, 2001), electric vehicles (Cowan and Hultén, 1996), nuclear reactors (Cowan, 1990), and the Korean alphabet (Choi, 2008).

3. Path dependence, lock-in and the D.S.M. – in outline

3.1. How the A.P.A.'s past success in publishing the D.S.M. facilitates future success

In the late 1970s, when work started on D.S.M.-III, few people were interested in classification in mental health (Decker, 2013). The lack of general interest enabled a small group of like-minded researchers to gain control of the revisionary process. These researchers, dubbed the "neo-Kraepelians" by Blashfield (1984), shared a particular outlook. They believed that diagnosis and classification mattered, that diagnostic criteria should be operationalised to achieve reliability, and that mental disorders would prove to be biologically-based medical disorders.

Subsequent to publication, the success of the D.S.M.-III took most by surprise (Decker, 2013). Crucially, the classification launched at a time when it was becoming the norm for mental health services to be paid for by insurance, and for insurers to demand a diagnosis. While insurance for mental health care was rare in the U.S. when the D.S.M.-I was published in 1952, coverage gradually increased throughout the sixties and seventies, and had become widespread by 1980 (Cooper, 2005, pp.127-132). The D.S.M. contains the codes used to fill in insurance forms. These codes are drawn from the version of the I.C.D. (the classification of disorders published by the W.H.O.) that is used in the U.S. Although these codes can be obtained without buying the D.S.M., the D.S.M. contains them in a user-friendly format, and most mental health professionals in the U.S. access the codes via the D.S.M. This is the main reason that mental health professionals of all types (not just psychiatrists, but also psychologists, social workers, and counsellors) buy and use the D.S.M. (Miller et al., 1981, Kutchins and Kirk 1988, Frazer et al. 2002).

During the same period, the testing, regulation, and marketing of psychoactive drugs came to see them as directed at specific disorders, as opposed to symptoms (Cooper, 2005, pp.112-118; Shorter, 2013, p.13). Researchers came to use D.S.M.-III diagnostic criteria to pick out subject populations for research; the F.D.A. demanded the use of D.S.M. categories in drug trials[3]; advertising started to employ the idea that psychoactive drugs treat specific

[3] Shorter, 2013, p13 cites Paul Leber, head of neuropharmacology at FDA speaking in November 1980, "The diagnostic system of choice is DSM-III. You may use another one. However, a DSM-III classification of every patient is required" (US Food and Drug Administration (Silver Spring, MD), Psychopharmacologic Drugs Advisory Committee, 18th meeting, 1980 Nov 6, p.162; obtained through the Freedom of Information Act).

conditions. Such activities helped legitimise the notion that the descriptions included in the D.S.M.-III were scientifically respectable and referred to real disorders. The net result was that the D.S.M.-III classification came to be much more widely used and more respected than its predecessors.

The successes of the D.S.M.-III left the A.P.A. in a much better position to construct successor classifications than any comparable organisations (such as the American Psychological Association, say, or national organisations of social workers or counsellors). Sales of the D.S.M.-III brought in $9.33 million (Blashfield et al., 2014, p.32), some of which the A.P.A. was able to reinvest in producing the next edition, D.S.M.-III-R. In its turn, the D.S.M.-III-R earned $16.65 million (Blashfield et al., 2014, p.32), of which $5 million was then spent on producing the D.S.M.-IV (Frances, 2013, p.175). This investment again yielded good returns, and between 2005 and 2011 the A.P.A. earned $5-6 million each year from sales of the D.S.M.-IV (Treasurer, 2012). Each revision of the D.S.M. costs more and more to produce; the D.S.M.-5 cost $25 million. The A.P.A. is able to invest so much in the D.S.M. because it is confident that sales of each new edition will bring in a profit. The sums of money involved make producing a competitor classification far beyond the reach of most organisations.

In addition, over time, the A.P.A. has built up the sorts of bureaucratic structures, expertise, and ways of working that enable it to produce the D.S.M. Revising the D.S.M. now involves multiple committees working for years. The experts who work to revise the D.S.M. are mostly unpaid. The reason that experts are prepared to help with the D.S.M. is because they have good reason to trust that the D.S.M. will be a successful, influential classification system. Those who play key roles in revising one edition of the D.S.M. tend to have served lesser roles in revising earlier editions. The A.P.A. has a deliberate strategy of including younger experts in revising the D.S.M., with the expectation that this will enable them to build skills that will enable them to better contribute to revising later editions (no author, 1988). [4] The end result is that today the A.P.A. has built up enviable in-house expertise, and can also call on internationally renowned out-of-house experts, to work on producing the D.S.M.

[4] This note in the APA archives titled "Principles of Workgroup Membership Selection" details a number of desiderata for workgroup membership. Ideally each should include one 'younger generation type' (defined as someone under 40) to develop experience for DSM-V and VI.

The money, skills, and networks that the A.P.A. has built up over time mean that the A.P.A. now has a huge advantage over other national professional organisations that might attempt to produce classifications of mental disorder.

3.2 How it became hard for the A.P.A. to radically change the D.S.M.

The second way in which the D.S.M. has become locked-in is perhaps more interesting. The D.S.M. has become locked-in such that it has become very difficult for the A.P.A. to produce a classification that differs much from earlier editions of the D.S.M. This has come about for several reasons:

First, it has become commonplace for D.S.M. categories to be employed in mental health research. This means that when it comes to revising the classification there is a substantial body of work available that can inform considerations as to whether particular categories should be revised. The advantage that this provides became apparent relatively early on. Those producing the D.S.M.-III-R (1987), many of whom had also been involved in constructing the D.S.M.-III (1980), noted that the build-up in research made their job far easier than their predecessors.

> The Work Group to Revise D.S.M.-III and its advisory committees had far more data about the diagnostic categories than did the Task Force that developed D.S.M.-III. The groups that develop D.S.M.-IV should have even more data as the basis for their deliberations. Therefore, the prospects for the future, and for the D.S.M.-IV in particular, are bright. (A.P.A., 1987, p.xxvii)

The available research is directed at D.S.M. categories, and thus evidence becomes available to guide tweaking D.S.M.-categories. Studies may well show that an extra symptom should be added to the diagnostic criteria for a particular disorder, that a diagnosis could usefully be split into subtypes, or that two diagnoses should be merged together. However, finding research that might inform shifting to a radically different type of classification system is very difficult. Almost everyone uses the D.S.M., and so such research is not done.

Second, as the D.S.M. has become ever more important, it's become tied to networks of other classifications and bureaucratic structures. Consider, for example, the complex links between the D.S.M. and insurance. It is important for A.P.A. revenues that the codes included in the D.S.M. be acceptable to insurance providers because the main reason that clinicians buy the

D.S.M. is for the codes. Making the D.S.M. insurance-friendly is a complex undertaking. The U.S. is bound by international treaty to use a version of the I.C.D., the classification produced by the World Health Organisation, for official medical coding. The U.S. Health Insurance Portability and Accountability Act (1996) also requires the use of I.C.D. codes. As such, the D.S.M. needs to maintain compatibility with the I.C.D. so that it contains codes that are acceptable to insurance companies. But this isn't the end of the problem. Rather than employing the I.C.D. in the form published by the W.H.O., the U.S. uses a "clinical modification" developed especially for use in the U.S., and development of the U.S. modifications lags years behind the revision schedule of the I.C.D. At time of writing, the U.S. is one of the last countries on earth still to be using a version of I.C.D.-9 (even though the I.C.D.-10 was published in 1990). The reason that the U.S. has been so slow to move to the newer version of the I.C.D. is that the systems used in funding U.S. healthcare are so complex, and split between so many different powerful service providers, that forcing through changes to the codes on which they depend has become a monstrous (and hugely expensive) undertaking (Reed, 2010). Still, though much delayed, a clinical modification of I.C.D.-10 is under development and is due to come into use in 2015. As a result,

> D.S.M.-5 contains both I.C.D.-9-C.M. codes for immediate use and I.C.D.-10-C.M. codes in parentheses. The inclusion of I.C.D.-10- C.M. codes facilitates a cross-walk to the new coding system that will be implemented on October 1, 2014 for all U.S. health care providers and systems [implementation has since been put back to 2015], as recommended by the Centers for Disease Control and Prevention's National Center for Health Statistics (C.D.C.-N.C.H.S.) and the Centers for Medicare and Medicaid Services (C.M.S.). (American Psychiatric Association, 2013b., p.1)

However, while the U.S. is only just moving to using I.C.D.-10, the rest of the world has moved on, and a new version of the I.C.D., I.C.D.-11 is due to be published by W.H.O. in 2015. Maintaining compatibility with this new version of I.C.D. is also essential if the A.P.A. to ensure long-term use of the D.S.M. The upshot is that the financial success of the D.S.M. depends on there being fairly direct translations between D.S.M.-5 disorders and codes in three different I.C.D. systems (I.C.D.-9-C.M., I.C.D.-10-C.M., and I.C.D.-11).This effort relies on the A.P.A. working "closely with staff from the W.H.O., C.M.S., and C.D.C.-N.C.H.S. to ensure that the two systems are maximally compatible" (American Psychiatric Association, 2013b, p.1).

In order to maintain compatibility with the I.C.D., when changing the D.S.M., the A.P.A. consults with the W.H.O. The users and purposes of the I.C.D. differ from those of the D.S.M. (Reed, 2010). As such, there is no guarantee that changes that would promote the interests of the A.P.A. will also satisfy the needs of the W.H.O. Although used around the world, the D.S.M. is primarily directed at clinicians and researchers working in the U.S. In contrast, the I.C.D. is specifically designed for international use. The I.C.D. comes in various versions. While the most complex is intended for use by researchers, two simplifications of this are produced, one for specialist clinicians, and one for use in primary care settings. Crucially all three versions of the I.C.D. are intended to be compatible, and the W.H.O. is committed to ensuring that the primary care version is suitable for use by non-specialist clinicians working in developing countries. This commitment constrains the possibilities for revising the I.C.D.

The need to maintain compatibility with the I.C.D., and to maintain acceptability by the insurance industry, creates complex constraints on the ways in which the D.S.M. can be revised. Furthermore, the I.C.D.-insurance-industry network is not the only network in which the D.S.M. is embedded. In the U.S., D.S.M. categories have been adopted by numerous government organisations. The D.S.M. affects everything from the ways in which school children with special needs receive services to the laws governing the detention of sex offenders. Any revision can thus have huge ramifications.

4. Specific examples of lock-in and the D.S.M.

Here I focus on two proposals that in the end could not be implemented, or at least not implemented fully. The first, comparatively small-scale, concerns revisions to autistic spectrum disorders. The other concerns the proposal to develop a dimensional classification for the personality disorders. Considering these two examples in some detail will make it plausible that the D.S.M. does indeed suffer from lock-in.

4.1. Asperger's disorder; the diagnosis that couldn't be taken back

Asperger's disorder was first included in the D.S.M. in D.S.M.-IV (1994). Here it is listed separately from autism, but is thought to be a related, though typically milder, disorder. When draft diagnostic criteria for the D.S.M.-5 were posted on the A.P.A. website in 2010 it became public that Asperger's disorder was to be removed as a standalone diagnosis.[5] The Work Group justified the proposed revision on the grounds that the D.S.M.-IV distinctions between autism, Asperger's and P.D.D.-N.O.S. (pervasive developmental disorder – not otherwise specified) could not be reliably drawn (Happé, 2011). They thus proposed doing away with the distinctions employed in the D.S.M.-IV. Instead, a new category, autistic spectrum disorder (A.S.D.), would include almost all of those previously diagnosed with autism, as well as most of those previously diagnosed with Asperger's disorder (as well as some other autism-related D.S.M.-IV conditions).

As soon as the proposed changes were announced they became controversial. A key worry concerned how the changes to the D.S.M. might affect overall prevalence rates of autism-related conditions (i.e. the D.S.M.-IV autism-like disorders lumped together versus new A.S.D.). Traditionally, and in the D.S.M.-IV, the key difference between children with autism and with Asperger's was that those with Asperger's showed no significant delays in early language skills, while those with autism developed language late, if at all. In merging the disorders, in D.S.M.-5 the criteria relating to problems with language development, previously included in the D.S.M.-IV as symptoms of autism, were removed. Other changes in diagnostic criteria were also made, for example, in the age by which symptoms must be manifest. The multiple differences between D.S.M.-IV and D.S.M.-5 made it hard to be sure whether a larger or smaller group of people could be expected to meet the new criteria.

Based on analyses using draft D.S.M.-5 criteria, a number of studies predicted that a significant number of those diagnosed under D.S.M.-IV would no longer be diagnosed (Mattila et al., 2011; Matson, et al., 2012;Dickerson et al., 2013). Prevalence rates matter hugely, particularly in the case of conditions such as autism-related disorders where costly therapies are indicated. As legal systems and bureaucracies use D.S.M. categories to

[5] The webpage that hosted proposed revisions while the D.S.M.-5 was under development has since been taken down by the A.P.A. (although it can still be accessed via The "Wayback Machine- Internet Archive" by searching for http://dsm5.org)

determine eligibility for services, the loss of a diagnosis can mean that the child risks losing educational and therapeutic services.

Patient and family support groups for those affected by autism-related conditions are well informed, and well organised, and were alert to the potential ramifications of changes to D.S.M. criteria on service provision. Autism groups came together to voice concerns that some of those with D.S.M.-IV autism-related diagnoses might not be diagnosed under D.S.M.-5. Petitions argued that broad definitions of A.S.D. should be maintained, and advocates organised for the A.P.A. to be bombarded with emails and phone calls protesting the proposed changes (Greenberg, 2013, pp.296-299). In the run up to publication of D.S.M.-5, a number of States also passed legislation stating that regardless of any changes to the D.S.M., all those diagnosed with Asperger's under D.S.M.-IV should remain eligible for insurance-coverage for their treatment (Connecticut General Assembly, 2013; Illinois General Assembly, 2013)

In the end, the A.P.A. compromised. In the published D.S.M.-5, Asperger's disorder has been deleted, and the diagnostic criteria for autistic spectrum disorder (slightly modified from those initially proposed) have been included. However following the new criteria, a note states that,

> Individuals with a well-established D.S.M.-IV diagnosis of autistic disorder, Asperger's disorder, or pervasive developmental disorder not otherwise specified should be given the diagnosis of autism spectrum disorder. (A.P.A., 2013, p.51).

This note is extraordinary, and unprecedented in the D.S.M. Given that there are clear differences between the old diagnostic criteria and the new, the claim that historical diagnoses can be maintained is most plausibly understood as aiming to retain services for those diagnosed under the D.S.M.-IV.

This move has not been enough to appease some autism advocacy groups, who are concerned not just to maintain services for those diagnosed under D.S.M.-IV, but also to ensure the provision of services for those diagnosed in the future. In 2013, in New York, Senate Bill 3044-A was proposed by Senator Carlucci (State of New York, 2013). This aims to write the D.S.M.-IV definitions of autism and Asperger's disorder into State Legislation on insurance coverage. The intent is to ensure that in New York D.S.M.-IV definitions as opposed to D.S.M.-5 definitions will determine eligibility for services. At time of writing this bill is still

making its way through the legislative process. The bill is supported by some autism advocacy groups:

> We haven't fought all these years for access to health insurance and services for people with autism to allow a committee of "experts" to define away our hard won gains….the legislature said loud and clear that they will not let the American Psychiatric Association dictate who gets care for autism in New York (Autism Action Network, 2013)

On the other side of the debate, the act is opposed by the New York State Psychiatric Association, who emailed members to ask them to lobby and oppose the bill. In the view of the N.Y.S.P.A.,

> The proponents of the legislation seek to freeze the definition of autism because they are fearful that the new definitions in D.S.M.-5 may diminish or eliminate eligibility for special education services in schools and/or health insurance coverage for community services. This is simply not true and would an improper intrusion of the Legislature into the realm of medical science. Medical professionals must have the ability to update and revise clinical diagnoses according to new scientific evidence and advances in medicine. (reported by PsychPractice Blog, 2013)

Here we have a case where a diagnosis, first introduced by the A.P.A. only in 1994, has since then become so entrenched that twenty years later it has become difficult for the A.P.A. to delete it from the manual. As a diagnosis, Asperger's has worked to unite a community of service users. Battles have been fought and won to ensure that special school services and health insurance now recognise children with Asperger's as legitimate claimants on services, and many service users identify as "aspies". The proposed revisions to D.S.M.-5 were seen to threaten all that had been achieved. In the arguments that have followed we see how the fact that diagnoses get used in determining eligibility for special services and insurance has made altering the diagnostic criteria problematic. The tensions around Asperger's not only forced the A.P.A. to add a note to the D.S.M.-5 that allows historic D.S.M.-IV diagnoses to stand, but also led to proposed legislation in some States that threatens to take control over psychiatric classification away from the A.P.A.

4.2. The failure to introduce a dimensional classification for personality disorders

Our second example concerns a proposed wider scale revision: the (failed) attempt to shift from a categorical to a dimensional classification system for the personality disorders. The D.S.M.-IV is a categorical classification system. For each disorder, diagnostic criteria are provided. A patient either meets or fails to meet the criteria, and is consequently said to either have or to not have the disorder (a yes/no decision). In contrast, on a dimensional system a patient is rated as having traits to a greater or lesser extent. Examples of widely-used dimensional classifications are the various rating scales for personality traits currently used by psychologists, where a person is described as being more or less extrovert, and more or less neurotic, for example.

Early on in the process of revising the D.S.M. there were expectations that the new classification would make greater use of dimensional measures. Under the D.S.M.-IV a great many patients met diagnostic criteria for more than one diagnosis, while others had many symptoms but failed to meet criteria for any specific condition. Many came to think that such problems could be reduced by the use of a dimensional system (Rounsaville et al, 2002; Krueger et al., 2005; Widiger & Samuel, 2005). The drive towards dimensions was particularly strong amongst researchers working on personality disorders (First et al., 2002; Widiger & Simonsen, 2005b.; Widiger & Trull, 2007). Personality disorders are deep-seated and typically life-long patterns of maladaptive personality functioning. Antisocial personality disorder (characterised by "a disregard for, and violation of, the rights of others"), and borderline personality disorder (characterised by "instability in interpersonal relationships, self-image, and affects, and marked impulsivity") (A.P.A., 1994, p.629), are probably the best known disorders in this class. With personality disorders, even more than in other sections of the manual, comorbidity was a problem; the majority of patients receiving a personality disorder diagnosis met criteria for more than one personality disorder (Skodol et al., 2013, p.342). At the same time, many patients failed to meet criteria for any specific personality disorder, making personality disorder not otherwise specified the most common personality disorder diagnosis (Skodol et al., 2013, p.342).

The idea that a dimensional approach to the personality disorders might be preferable had long been in the air. Allen Frances, chairman of the D.S.M.-IV (1994), had been sympathetic

to the idea that the personality disorders should be diagnosed using a dimensional system (Frances, 1993). Ultimately, however, the D.S.M.-IV ended up continuing with a purely categorical approach. The D.S.M.-IV personality disorder work group considered adding an alternative dimensional model, but concluded that clinicians would be "unlikely to accept added diagnostic complexity" (Gunderson, 1996 p.650).

Between the D.S.M.-IV and the D.S.M.-5 work on dimensional approaches continued (for a review see Widiger & Samuel, 2005). Widiger & Simonsen (2005a) showed how the distinct dimensional systems that had been developed might be interpreted as having common factors, thus providing a way forward for one compromise system to be developed and included in the D.S.M.-5. Early on in the revisionary process the A.P.A. endorsed the idea that the personality disorders section should move to a dimensional approach (Rounsaville et al., 2002, p.13) and sponsored a conference to discuss ways forward for the D.S.M.-5 (Widiger & Simonsen, 2005b.). There was massive support amongst researchers for a move away from the D.S.M.-IV categorical system. A study of the members of two organisations, the U.S.-based Association for Research on Personality Disorders and the International Society for the Study of Personality Disorders, surveyed personality disorder researchers and found that 74% thought the D.S.M.-IV categorical approach should be replaced. 80% claimed that personality pathology was dimensional in nature (Bernstein et al., 2007).

However, although there was a broad consensus amongst researchers that a dimensional system would best classify the personality disorders, the D.S.M. is not only a classification for research. It has also got to be used by clinicians and administrators, and influential figures began to voice concerns that such users might struggle to use a dimensional system. Michael First was the text editor for D.S.M.-IV, and D.S.M.-IV-TR, and is an acknowledged expert on the details of the D.S.M.-system. He warned,

> Adopting a dimensional approach would likely complicate medical record keeping, create administrative and clinical barriers between mental disorders and medical conditions, require a massive retreating effort, disrupt research efforts (e.g., meta-analyses), and complicate clinicians' efforts to integrate prior clinical research using D.S.M. categories into clinical practice. (First, 2005, p.560)

In the face of such concerns, proponents of dimensional approaches attempted to demonstrate that such classifications could be used in the clinic. However categorical D.S.M.-IV styles of

diagnosis proved so entrenched that even establishing a methodology that would fairly compare the usability of categorical and dimensional systems proved problematic. Studies tended to employ case vignettes, which clinicians classified using each of the competing systems. Easily available vignettes had often been developed for the purposes of teaching or illustrating diagnosis on the D.S.M.-IV system, and had been designed to provide information that fitted with D.S.M.-IV diagnostic criteria. As such, categorical approaches gained an unfair advantage (Samuel and Widiger, 2006, p.300). In addition, given that all clinicians were used to employing the categorical D.S.M.-IV approach it was hard to estimate how easy employing a dimensional approach would be once clinicians had become used to the new system.

The idea began to be mooted that moving straight to a dimensional system in D.S.M.-5 would be a mistake. Although arguing that psychiatric classification should eventually come to rely more on dimensions, Helzer, Kraemer and Kruger (2006) suggested that "as we contemplate adding a dimensional component to psychiatric diagnosis to better position ourselves to address future needs, it is vital that we also preserve a solid bridge to the categorical taxonomy" (p.1678). A paper co-authored by Skodol, chair of the personality disorder work group concurred,

> …a novel dimensional system for P.D.s in D.S.M.-V could represent an unnecessarily abrupt departure from the constructs described in D.S.M.-IV, some of which have garnered extensive clinical and research interest. Although implementation of dimensions in D.S.M.-V is called for by the research literature, this implementation will likely be more successful if it is an orderly and logical progression from D.S.M.-IV. (Krueger et al., 2007, p.S65)

The paper goes on to suggest that work should begin on developing ways of "synthesizing categorical and dimensional approaches to personality disorders that could inform the construction of D.S.M.-V" (Krueger et al., 2007, p.S65).

The DSM-5 work group on personality disorders went on to develop a hybrid model, which was made public as a part of the draft D.S.M.-5 published on the D.S.M.5.org web site in

February 2010 (described in Skodol et al. 2011).[6] This model sought to maintain continuity with the D.S.M.-IV personality disorder categories but also to include dimensional components. The model "combined a dimensional severity measure, dimensional prototype matching for describing PD types, and ratings of pathological personality traits" (Skodol et al., 2013, p.344).

The proposed system was widely condemned as overly complex (e.g. Livesley, 2010; Widiger, 2011; Silk, 2013, p.350,). Furthermore, the consequence of being pulled in two directions was that the hybrid model was neither a proper categorical system nor a proper dimensional system. Compared to the D.S.M.-IV, the categorical component was much reduced. While the D.S.M.-IV provided diagnostic criteria for ten distinct personality disorders; the hybrid proposal included narrative descriptions of five personality disorder prototypes. A categorical system based on diagnostic criteria requires the clinician to go through a list of criteria one by one and see if the patient has sufficient symptoms for a diagnosis. A prototype matching system provides a brief description of a typical patient and leaves the clinician to judge whether the patient being diagnosed is sufficiently similar. Prototype matching is quicker than checking diagnostic criteria, but widely considered a less reliable system. The proposed shift to less-reliable prototypes was widely condemned (e.g. Livesley, 2010; Widiger, 2011), and the deletion of half the D.S.M.-IV personality disorder categories also met with much opposition, with critics arguing that this or that category had been useful and should be retained (e.g. Livesley, 2010; Widiger, 2011). The dimensional part of the proposed system also met with criticism. Rather than drawing on the various dimensional systems that had previously been developed, the desire to ensure some sort of continuity with the D.S.M.-IV had led the work group to develop their own unique system (Skodol et al., 2011). Advocates of dimensional systems worried that there was little empirical support for the dimensional component of the proposals (Widiger, 2011).

Against such criticism, and at the request of the D.S.M.-5 Task Force, a new proposal was developed that replaced the prototypes with sets of diagnostic criteria, and reinserted one of the deleted personality disorder categories (Skodol, 2012). The dimensional component of the hybrid model was also revised and simplified. The basic problems, however, remained. The proposal was still very complex, and satisfied neither those who advocated for a categorical approach, nor those who preferred a dimensional approach. Gunderson (2013)

[6] The A.P.A. has since removed this website (although it can still be accessed via The "Wayback Machine-Internet Archive" by searching for http://dsm5.org)

suggests that the proposed "amalgam of two systems…was too radical to offer continuity with the past, too conceptually incoherent, and too complex to be used clinically" (p.370).

Ultimately the revised hybrid model failed to be approved by the A.P.A. committees that were responsible for overseeing the development of D.S.M.-5. The Scientific Review Committee was charged with reviewing each proposed revision to the D.S.M. to see if the empirical evidence supported the revision. Here the proposals for the personality disorders ran into difficulties. As the work group had proposed a substantially new approach to personality disorders, little data on the validity of the proposed model was available. (Skodol et al., 2013, pp.347-8). The committee responsible for reviewing the usability and policy implications of proposed revisions also had concerns. The Clinical and Public Health Committee, worried that the "proposed model was too complicated and unfamiliar for immediate use by psychiatrists" (Skodol et al., 2013, p.348).

Finally the Board of Trustees decided that the new hybrid model should be placed in a D.S.M.-5 appendix of "Emerging Measures and Models" (A.P.A., 2013, p.761). Some members of the personality disorder work group suggest that the inclusion of the hybrid model in a D.S.M.-5 Appendix will facilitate further research on the model which might lead to its inclusion in the body of a later edition of the D.S.M. (Krueger, 2013). An alternative reading of the decision to include the hybrid model only in an appendix is that it was a face-saving means of rejecting the proposal.

In the main body of the D.S.M.-5 text, the D.S.M.-IV diagnostic criteria for the personality disorders have been reproduced. As previously discussed, experts in personality disorders generally have little affection for the D.S.M.-IV system. A member of the personality disorder working group condemns the D.S.M.-IV personality disorder classification as being "fundamentally broken" and recommends that it should not be used in the clinic or in research (Krueger, 2013, p.358).

To sum up, in the personality disorders section of the D.S.M. we have a case where researchers near universally considered a revision to be necessary, but where the requirement to maintain some continuity with the past meant that desired changes could not be achieved. The personality disorders section of D.S.M.-5 has become locked-in.

5. Overcoming lock-in

We have seen how the D.S.M. has become locked-in. In so far as the D.S.M. aims to classify psychopathology so as to facilitate scientific research, this is plausibly a bad thing. As illustrated by the history of the D.S.M.-5 section on personality disorders, even when the research community agrees that the current classification is inadequate and should be replaced it remains. Lock-in thus results in the adoption of sub-optimal classifications.

Through considering the ways in which the D.S.M. has become locked-in, we can see that rather than lock-in being merely a contingent, and unfortunate, side-effect of success, lock-in will always be a risk when a classification comes to be widely used. As the classification came to be used by more and more communities, it became embedded in more and more systems, and became harder and harder to revise. As users became ever more familiar with the D.S.M. system conceiving of shifting to anything radically different became more and more difficult.

However, while the D.S.M. is currently locked-in this may change in the future. Lock-in is a time specific and agent-relative phenomenon. Changes that the A.P.A. was unable to make to the D.S.M.-5 may turn out to be possible for the some later edition of the D.S.M., or for some other new classification of mental disorders, possibly produced by another organisation.

How can lock-in be overcome? In the literature on the lock-in of technologies a number of methods are commonly suggested: First, a central authority, for example, a government, may dictate a switch to a new system (Cowan and Hultén, 1996). This method of overcoming lock-in is best illustrated by those cases where a country switches from driving on one side of the road to the other. No individual driver could decide to make the switch, but the government has the power to make sure that everyone adopts the new standards. Second there are cases where an entrepreneur is so sure of the benefits of a new technology that he or she subsidises change-over costs, so as to break the monopoly held by the old technology (Liebowitz & Margolis, 1990). Thus, a company may offer special deals for "early adopters" of their new products. Third, it may be possible to overcome lock-in via creating a niche market (Cowan and Hultén, 1996); if some smallish number of users of a technology are sufficiently isolated then it may be possible to convert them to a new system even if most continue in the old ways. Edison's first electric lighting system, for example, was installed on a steamship – a niche isolated from the then dominant systems of urban gas lighting (Utterback, 1994). Fourth, on occasion, lock-in has been overcome because users so dislike

the idea of being locked-in that they employ heroic measures to shift to a new technology. Thus, the German municipality of Munich recently moved from Windows to Linux, in large part for political reasons (Dobusch, 2008). Fifth, some crisis may render continuing with the status quo untenable. Cowan and Gunby (1996) discuss how the development of pest resistance has forced a switch away from the previously locked-in practices of heavy pesticide use in various types of agriculture. Each of these methods can only be employed when the time and circumstances are right. The levers of change - legislative clout, cash, niches, grassroots resistance, crises – tend to be in short supply. The reason that lock-in is time and agent relative is because only certain agents, at certain times, have access to the means necessary for overcoming lock-in.

Developments are currently underway that may come to challenge the dominance of the D.S.M. system. Inspired by the thought that the use of D.S.M. categories may now be holding back research, the U.S. National Institute of Mental Health is developing a radically different classification aimed at researchers. The Research Domain Criteria project (RDoC) aims "to define basic dimensions of functioning (such as fear circuitry or working memory) to be studied across multiple units of analysis, from genes to neural circuits to behavors, cutting across disorders as traditionally defined" (N.I.M.H., no date a.). The system relies far more on dimensions and is more biologically-focussed than the D.S.M. Instead of researchers studying groups of patients diagnosed with say schizophrenia, or P.T.S.D., they will study groups suffering from problems with, say, impulse control or emotional lability.

We can see the RDoC project as aiming to break the hold of the D.S.M. on psychiatric classification via utilising a number of the strategies that have been used to successfully overcome lock-in in other settings. As a major grant giver the N.I.M.H. is a "central authority", at least as far as U.S. researchers are concerned. The N.I.M.H. has announced that it will expect the recipients of grants to use RDoC rather than D.S.M. (Insel, 2013). Big money is involved; the 2014 budget of the N.I.M.H. was $1.47 billion (N.I.M.H., no date b.). Second, in so far as RDoC only aims to be used by researchers, it can be understood as being aimed at a niche market. While researchers may move to using RDoC, the D.S.M. is still expected to be used in the clinic. In the future, RDoc may break the monopoly of the D.S.M., but as yet it is early days for the project and too soon to tell whether it will succeed.

I have shown that path dependence has led to the D.S.M. becoming locked-in, at least for now, thus limiting the revisions that could be introduced for the D.S.M.-5. However, the idea that each edition of the D.S.M. is only provisional has played a key role in the way in which the classification has been developed and marketed. The D.S.M.-III was sold as "only one still frame in the ongoing process of attempting to better understand mental disorders" (A.P.A., 1980, p.12), while the D.S.M.-5 remains only "the current consensus on the evolving knowledge in our field" (A.P.A., 2013, p.24). The notion that each edition of the D.S.M. is provisional and will one day be revised in the light of future research has played a crucial role in ensuring its acceptance. Most mental disorders are as yet inadequately understood and experts commonly disagree about how they should best be diagnosed. Against a background of such controversies, the idea that the diagnostic criteria included in any edition can always be revised at a later date has played an essential role in enabling sufficient consensus amongst those working on revisions for an edition to be agreed. Diagnostic criteria are conceived of as being agreed for fifteen years or so, and no longer. My claim that the D.S.M. is currently locked-in challenges the idea that D.S.M. criteria can always simply be revised if at some later point it comes to be thought that an alternative would be preferable .

More broadly this study demonstrates that stasis in science can be worthy of explanation; sometimes nothing happens for a reason. The idea that science is conservative is, of course, already widely known and accepted. Kuhn (1970) himself taught us that revolutionary change in science is costly, and undertaken only when a field is presented with crisis. Kuhn likens the costs of paradigm change to those of retooling a factory. He notes that "As in manufacture so in science – retooling is an extravagance to be reserved for the occasion that demands it. The significance of crises is the indication they provide that an occasion for retooling has arrived" (1970, p.76). This study of the problems of revising the D.S.M. demonstrates that even Kuhn under-estimates the difficulties that can sometimes face those seeking change. With the D.S.M. we have cases where research communities are willing to "retool" their own factory, but where this isn't sufficient to enable change. To develop Kuhn's analogy further, bringing about revisions would also have required convincing other factory owners, with quite disparate interests, to retool as well. And this, in the end, and for now, could not be achieved.

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