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*The Politics of Evidence-based Policymaking*

## Preface

When I first presented a paper on this topic, I joked that, having read one of Patrick Dunleavy's blog posts on the importance of descriptive paper titles, I was so pleased with this one that I didn't have to bother with the rest: *Evidence Based Policymaking: If You Want to Inject More Science into Policymaking You Need to Know the Science of Policymaking*.

I then toyed with the more enigmatic *The Science of Policymaking* and *The Science of Evidence-based Policymaking*, to make it shorter but still signal that the book is a call to scientists to better understand the policy process before they criticise it or seek influence within it. Such titles might also highlight the early post-war idea that the policymaking process will be improved when we make it more scientific and, therefore, better able to incorporate scientific evidence. This idea has given way to a more recent sense that policymaking will always be messy, and that an appeal to the primacy of science or 'the evidence' can go too far, if it suggests that there can be technocratic solutions to political problems.

Although I settled on *The Politics of Evidence-based Policymaking*, to sum up a more general need to recognise the role of politics in policymaking, the original title still sums up the aim of this book: to draw insights from policy theory, to make a useful contribution to the study of 'evidence-based policymaking' (EBPM); and, to challenge scientific advocates to recognise these insights when engaging in the policy process.

*Applications to health and environmental policy*

I apply these insights to two policy areas in which there is an unusually strong link between the production of scientific evidence and advocacy for policy change: health and environment. In both cases, the suppliers of scientific evidence, about the pressing nature of a policy problem, often become frustrated when policymakers do not respond in a timely and proportionate way. Consequently, an important new literature has developed, in which scientists attempt to identify the barriers to turning evidence into policy. In many cases the analysis is naïve and underpinned by minimal policy theory. I use an extensive synthesis of the policy literature to provide a more realistic and, therefore, practical guide to policy advocates. Consequently, the book has these broad advantages. It:

1. Informs scientific debates on the nature, and limitations, of EBPM.
2. Provides scientists, and other actors without a background in the policy sciences, a way to understand complex government.

3. Provides a comparison between, and ability to draw lessons from, policy areas in which there are important overlaps between science and advocacy.
4. Provides a comparison of EBPM processes in different governing contexts, from the global to the national and local.
5. Helps scientists and other actors understand how they can adapt to complex government to become more effective when they present evidence.

**Acknowledgements**

To Kathryn Oliver and Adam Wellstead (see chapter 1).

## Chapter 1 - If you want to inject more science into policymaking you need to know the science of policymaking

The term 'evidence-based policymaking' (EBPM) is in common currency in media and social media. Generally, it is a vague, aspirational term, rather than a good description of the policy process. For some, it represents an ideal which governments fail to reach. A common allegation is that policymakers ignore or do not understand or act on the correct evidence. In other words, the identification of a problem by scientists should produce a proportionate solution, and policymakers should select the most effective, evidence-based solution – but they don't.

Policy studies provide more critical discussions of the EBPM concept, often suggesting that people are naïve if they think that this kind of EBPM is a possibility and that you should not waste your time in wanting something that you can't have (Bastow et al, 2014a; 2014b; Monaghan, 2011: 6). In earlier post-war debates, Lindblom's (1964: 157) famous analogy was between unaided versus mechanical human flight: any attention to the flight of fancy is time not spent on the more realistic aim.

Policy studies help us challenge two extreme views: the naïve-EBPM view that there can and should be a direct and unproblematic link between scientific evidence, policy decisions and outcomes: and, the 'policy based evidence' view that politics is so pathological that no decision is based on an appeal to scientific evidence if it gets in the way of politicians seeking election, or so messy that the evidence gets lost somewhere in the political process. Indeed, if we initially hold the naïve view, when we engage in politics, we may quickly become disillusioned and develop the more cynical view. Neither view is helpful to people trying to understand the role of evidence in the policy process and, in some cases, influence that process. Rather, we need two things.

### The meaning of EBPM: let's go beyond unclear definitions and ill-considered aspirations

Our first requirement looks relatively simple: more clarity about what EBPM means, and should mean, in practice. Many scientists use EBPM to refer to something that should happen: there can and should be a direct and unproblematic link between 'the evidence' and policy decisions and outcomes. Further, the phrase 'evidence based policy making' has a 'bewitching' effect and seems like a valence issue: who could not want it? Yet, we cannot want something if we do not really know what it means, or what each word means:

*Policy*. There is no single accepted definition of policy. I use the working definition 'the sum total of government action, from signals of intent to the final outcomes' to raise important qualifications: (a) it is problematic to conflate what people *say* they will do and what they actually do; (b) a policy outcome can be very different from the intention; (c) policy is made routinely through cooperation between elected and unelected policymakers and actors with no formal role in the process; (d) policymaking is also about the power *not* to do something (Cairney, 2012a: 24-5). It is also important to identify the many components or *policy instruments* that make up policies, including: the level of spending; the use of economic

incentives/ penalties; regulations and laws; the use of voluntary agreements and codes of conduct; the provision of public services; education campaigns; funding for scientific studies or advocacy; organisational change; and, the levels of resources/ methods dedicated to policy implementation (2012a: 26). In that context, we are trying to capture a process in which actors make and deliver 'policy' continuously, not identify a set-piece event which provides a singular opportunity to use a piece of scientific evidence to prompt a policymaker response.

*Policymakers*. The intuitive definition is 'people who make policy', but there are two important distinctions: (1) between elected and unelected participants, since people such as civil servants also make important decisions (see also Bédard and Ouimet, 2012: 628 on policy analysts); (2) between people and organisations (both can be described as 'actors'), with the latter used as a shorthand to refer to a group of people making decisions collectively ('institution' describes the rules to which such actors make reference). These distinctions are crucial, to remind us that advocates would miss something important if they focused their energies only on elected politicians. There are blurry dividing lines between the people who *make* and *influence* policy. Terms such as 'policy community' suggest that policy decisions are made, in some sense, by a collection of people with formal responsibility and informal influence. Consequently, we need to make clear what we mean by 'policymakers' when we identify how they use evidence.

*Evidence and scientific evidence*. We can define evidence as an argument or assertion backed by information. Scientific evidence therefore describes information produced in a particular way. Some use 'scientific' broadly, to refer to information gathered systematically using recognised methods, while others refer to a specific hierarchy of scientific methods, with randomized control trials (RCTs) and meta-analysis/ the systematic review of RCTs (published in high status peer reviewed journals) at the top (see Nutley et al, 2013). The latter definition is at the heart of EBPM debates in health and environmental policy, primarily because many people are unaware of, or unattached to, this hierarchy. Policymakers may not go as far as describing 'evidence based claims', or a distinction between positivist and constructivist understandings of objective facts (by detached and value free scientists) and subjective understandings (Marston and Watts, 2003: 150-7). However, they will seek many kinds of information that scientists would not consider to be part of 'the evidence'.

Overall, these definitions don't take us very far. 'Evidence' is assertion backed by information. 'Based' is a metaphor. 'Policy' is one of the worst-defined words in politics. Policymaking implies there is a policymaker, but we don't always know who it is. This seems like just a semantic discussion, but there is a lot of confusion in the EBPM literature simply because people begin by complaining that we don't have it without really saying what it is. A focus on phrases like 'evidence informed' doesn't always help, because it is no less difficult to point to a policy and show how it relates to 'the evidence'.

Part of this confusion, among advocates of EBPM, relates to a lack of knowledge of key aspects of the policy process. For example, many debates confuse two different kinds of evidence-based activity relating to: *the size of the problem* (for example, the number of smokers and the link between smoking and ill health); and, *the effectiveness of the solution*

(for example, the effect of higher taxes and health warnings on consumption). In the former, evidence may be used to prompt attention, and exhort an appropriate response, to a problem. In the latter it may be used to generate knowledge on the effectiveness of solutions. Yet, in ill-disciplined debates, it is common to bemoan an insufficient link between the evidence on the size of a problem and the choice of solution, or to assert that the scientists who identify the problem are best placed to propose a solution.

More generally, scientists may be describing the extent to which they feel that policymakers listen to what they have to say, and act on that basis. In some cases, people are quick to say that a policy is 'not evidence based' if policymakers only listen to some of what they have to say and/ or only adopt some of their recommendations. Yet, this is possibly the most they could reasonably hope for in a political system. Instead of suggesting that politicians mangle *the* evidence, we should recognise that elected policymakers are legitimate actors.

The idea that policymakers should base their decisions primarily on scientific evidence may seem intuitive, but it is problematic if we argue simply that the evidence should come first, and bemoan the inability of policymakers to act accordingly. There are many other, equally defendable, roles for research, such as to inform solutions to a problem identified by elected policymakers, or to contribute to long term public 'enlightenment' (Weiss, 1979). Scientists can help identify problems, and assess the effectiveness of solutions, without feeling that they should be at the centre of a democratic policymaking system.

**Let's understand the policy process to recognise the role of evidence within it**

Our second requirement is less simple: we need to understand the policy process to explain how actors use evidence within it. That is the aim this book. I take the naïve view of EBPM as a starting point, to argue that it represents an ideal-type. An ideal-type can be something to aspire to, but its main purpose is to help us compare an artificial situation with the real world, to help us better describe and explain reality. This starting point is central to policy studies. We describe the ideal type, *comprehensive rationality*, in which policymakers are able to generate a clear sense of their preferences, gather and understand all relevant information, and make choices based on that information. Then, we describe *bounded rationality*, or what really happens when policymakers have unclear aims, limited information, and unclear choices. Our focus is on the ways in which policymakers understand information such as scientific evidence, taking into account the short cuts they use when they have limited means to process it. This takes place in a policy environment which contains many other policymakers and pressures, and which influences how they act and how much control they have over the final outcomes.

*The value of policy theory*

The policy literature contains theories and studies which can be adapted to explain how evidence-processing fits into the wider policy process. These studies have two key points in common. First, we need to understand the *psychology of policymaking.* Policymakers have to make important decisions in the face of *uncertainty*, based on limited information, *ambiguity*, based on the fact that there are many ways to understand a policy problem (this kind of

uncertainty cannot be solved by more information), and competition between actors to interpret information and draw conclusions (Zahariadis, 2007: 66). They do so by drawing on policymaking short cuts, such as by using information from sources they trust, and by adapting that information to the beliefs they already hold. In other words, since policymakers do not have the ability to gather and analyse all information, we need to identify the heuristics they use to gather what they can. This may reveal their biases towards certain sources of evidence – which may be more important than the nature of the evidence itself.

Further, in a political environment where evidence is rarely conclusive enough to remove uncertainty, and cannot remove ambiguity, persuasion and argument are the tools used by policy participants to resolve problems (Majone, 1989: 8; 21; Cairney, 2012a: 234; Sanderson, 2009: 712). By stating that policymakers can only pay attention to a tiny fraction of the issues for which they are responsible, we identify which issues they put to the top of the agenda and which they ignore. There is a lot more to this process than the nature of the evidence – it is about how problems are 'framed' by their advocates and how they are understood by the policymakers held responsible for solving them. It is about the power to ignore or pay attention to particular studies; to link the evidence of a policy problem to a particular solution; and, to ensure that policymakers have the motive and opportunity to turn a solution into policy (Kingdon, 1984; 1995; Béland, 2005: 10).

Second, we need to know *how policymakers fit into a complex policymaking system*. This involves getting away from the idea, implicit in many discussions of policymaking, that there is a concentration of power in the executive. Rather, there are many policymakers involved, and many other actors with the ability to influence the process. We may begin with the ideal-type of a single comprehensively rational policymaker at the heart of the process, but end by identifying a complicated picture in which many actors – at many levels or types of government – use evidence to make or influence policy.

Policy studies use a range of concepts to capture this picture, including a focus on actors and their policy environment: *institutions*, or the rules and norms that actors follow in governmental organisations; *ideas*, such as the beliefs that actors use to define policy problems, or the solutions they propose; *networks*, or the relationships between policymakers and the participants, such as interest groups, with which they consult and negotiate; *context*, or the socioeconomic factors to which policymakers must pay attention; and *events*, or the anticipated (such as elections) and unanticipated (such as crises) occasions which change the conditions in which decisions take place. These concepts help change how we see the role of evidence: from focusing on its use by policymakers at the 'top', or at a notional single point of decision, towards explaining how it is understood by many policymakers, continuously, throughout the political system as a whole.

For example, 'punctuated equilibrium theory' uses bounded rationality to identify long periods of policymaking stability and policy continuity punctuated by profound bursts of instability and change (Baumgartner and Jones, 1993; 2009). In some cases, policymakers ignore some evidence for years, then, very quickly, pay disproportionate attention to the same evidence. This may follow the replacement of some policymakers by others (for example,

after elections) or a 'focusing event' which prompts the same policymakers to shift their attention from elsewhere (Birkland, 1997). Some studies of 'policy diffusion' (the spread of policy solutions across many governments) use bounded rationality to identify emulation in the absence of learning; the importation of a policy by a government which may not possess much evidence about why it was successful somewhere else (Berry and Berry, 2014). In such cases, a policy may be introduced as much because of its reputation as the evidence of its transferable success. In other approaches, such as the 'advocacy coalition framework', we can identify a battle of beliefs, in which different groups seek to gather and interpret evidence in very different ways, and encourage policymakers to emulate their way of thinking (Sabatier and Jenkins-Smith, 1993; Jenkins-Smith et al, 2014). Policymaking is often about the dominance of one interpretation of the world. This dominance often takes time to overcome, suggesting that it is unusual for new evidence to have a direct, immediate and profound impact on the actions of policymakers. Indeed, some of the evidence that now informs policies – and which we now take for granted – has taken decades to be accepted within government (Cairney et al, 2012: 214-5; Cairney and Studlar, 2014).

In this context, a simple appeal for the government to do something with 'the evidence' is naïve. It highlights a potential irony: people seeking to inject more scientific evidence *into* policymaking may not be paying enough attention to the science *of* policymaking. Instead of bemoaning the lack of EBPM, we need a better understanding of 'bounded-EBPM' to inform the way we conceptualize evidence and the relationship between evidence and policymaking.

**The structure of the book**

To demonstrate this argument, I present four main chapters.

*The role of evidence in theories of the policy process*

In this chapter I define comprehensive and bounded rationality, and related terms such as policy stages and cycles, to demonstrate the value and pervasiveness of ideal-types in policy studies. Such terms help frame the policy studies that engage directly with the idea of EBPM. They also underpin a range of modern theories of the policy process which can be used to help further explain the role of evidence within it. I highlight the importance of a focus on the psychology of actors, and the key concepts in the field – actors, institutions, networks, ideas, context, and events – on which theories draw to explain policymaking. I then outline theories which focus on: how people frame problems, propose solutions, and react to their policymaking environments; how policymakers characterise 'target populations' or construct policy 'narratives'; the beliefs of actors and the formation of coalitions; and, the spread of evidence across governments.

*Health and advocacy: what are the barriers to the use of evidence in policy?*

There is now a large literature on the barriers to the use of research evidence in policy and practice. However, only recently have there been systematic reviews, by scholars in health sciences, which seek to incorporate the role of policy theory in the explanation of health policy processes (Oliver et al, 2014a; 2014b; Embrett and Randall, 2014) and

'implementation science' (Nilsen et al, 2013). In this chapter, I analyse the literature critically, identifying a tendency to bemoan the evidence-policy gap without using policy theory and empirical policy studies to inform the analysis. Drawing on chapter 2, I identify the ways in which policy theories can re-frame health policy analysis, to separate the 'pathologies' of all policymaking systems from specific problems that can be addressed to reduce the evidence-policy gap. I draw on two case studies: tobacco policy, to demonstrate a relatively successful (but ongoing) project, by tobacco control advocates, to turn the identification of a health problem into a proportionate policy response; and, the role of 'improvement science' which focuses on how practitioners use evidence on 'the ground' or 'street level'.

*Evidence in environmental policy: learning lessons from health?*

Building on the format of chapter 3, I critically analyse the literature which identifies the 'barriers' to the adoption of evidence in environmental policy. I connect this literature to contemporary debates on the 'barriers' to progress in climate change adaptation policy, to identify a similar gap between environmental policy scholarship and policy theory. In each case, I identify the ways in which policy theories can provide a more sophisticated account of the gap between scientific evidence and (a) the identification of environmental problems, and (b) meaningful policy responses. As in chapter 3, I add case study discussions to give more depth to abstract discussions. I provide a comparison between tobacco control and climate change policies to demonstrate the issues that arise in 'global public policy', and to provide an alternative to a focus on 'barriers' to adaptation. Then, I examine the current debate on hydraulic fracturing ('fracking') which raises practical issues regarding the use of evidence in issues involving an unpredictable mix of high salience, scientific uncertainty, policy ambiguity, multi-level governance, and public protest.

*Discussion and conclusion: a realistic guide for scientist advocates and policymakers*.

I compare the results in health and environmental policy, to identify common themes and policy insights that travel across both areas. From there, I discuss the practical and normative implications of 'bounded EBPM'. I discuss how scientists, seeking to influence the policy process, can act in a more informed way, to consider the extent to which EBPM *can* and *should* become more like the 'comprehensive rationality' ideal. Should scientists stop bemoaning the real world and start adapting to it? Should they accept the description of 'bounded EBPM' but reject it as a prescription? I consider alternative ways to think about EBPM, considering the legitimate role of elected policymakers, to pay selective attention to scientific evidence, and weigh it up against the preferences of other participants in the policy process, such as 'the public', the users of public services, and the organisations charged with implementing policy. In that context, I outline a set of ways in which scientists can adapt, to influence, rather than simply bemoan the pathologies of, the policy process.

**The method of literature review**

In chapter 2, to present insights or 'key tenets' from policy studies, I offer what is often called a 'narrative review'. It involves an unusually large initial search with wide parameters

– to produce an initial review of approximately 1000 articles and books on public policy, which I used to produce two books, on policy theory (Cairney, 2012) and public health policy (Cairney, Studlar, and Mamudu, 2012). I then conducted a narrower search process, combining an initial Google Scholar search (using the terms such as 'evidence based policy' and 'evidence based policymaking') and a snowballing exercise using the cited literature in each text. This method is more labour intensive but produces far more relevant material than would be identified by a systematic review using a narrow search for modern terms such as 'evidence based policymaking', because a large part of the post-war literature discusses the EBPM processes without referring to EBPM (or 'evidence').

Then, I select a small number of policy theories to identify how they explain the role of evidence within the policy process. The scientific criteria for the selection of theories is often highly-contested in policy studies (Cairney, 2013a), but it is possible to compare my list (in Cairney, 2012; Cairney and Heikkila, 2014) with comparable texts which make very similar selections (including Sabatier and Weible, 2014; John, 2012).

Chapter 2 provides an abstract discussion that can be treated as 'universal', or not specific to one time, place or policy area. However, a large part of the EBPM literature comes from the UK and Australia, while most policy theories were developed in studies of the US. There are relatively few applications of these theories in low- and middle-income countries, where the evidence-policy process may be distinctive in some ways (Lavis et al, 2006). Further, the vast majority of studies in chapter 3 come from Canada, the UK, the US and Australia – and our assumptions about their research and policymaking capacity is exposed when we compare their processes to those in countries such as Guinea Bissau (Kok et al, 2012a).

To provide an initial structure to chapter 3, I use an established systematic review (Oliver et al, 2014a) of the 'barriers', identified largely by health scientists, to the use of evidence in health policy. Then, I examine in more detail the most relevant articles, based on the advice of Kathryn Oliver, who identified a subset of 35 articles from her co-authored systematic review. Finally, I use insights from policy theory to address the limitations of this literature.

In chapter 4, I identify comparable arguments, on 'barriers' and a gulf in academic-policymaker 'culture', in the literature on environmental policy. This is based initially on 33 articles identified by Adam Wellstead (who replicated Oliver et al's 2014 search process) and a snowballing exercise in which I analysed over 60 articles described as relevant to EBPM discussions in the initial 33.

Finally, in chapter 5, I present an essay on the practical and normative implications of 'bounded EBPM' for scientists seeking to influence the policy process. I argue that scientists should identify how the policy process works and seek to influence it on that basis – not according to how they would like it to be. They should also reflect on the idea of 'good' policymaking, of which the use of scientific evidence is only one part. It is impossible and undesirable to take the politics out of policymaking so that we can rely solely on 'the scientific evidence'.

## Chapter 2

## The Role of Evidence in Theories of the Policy Process

To paint an accurate picture of EBPM, I compare its ideal-type with more realistic accounts. This approach has a long history in post-war policy studies, in which we begin with the ideal-type of 'comprehensive' or 'synoptic' rationality to identify 'bounded rationality' in the real world. The links between older studies of rationality and new debates on EBPM are remarkably strong. They have also been given a new twist following major advances in research and information technology, which allow us to gather and exchange information in vastly superior ways than in the early post-war period.

Yet, these advances have not, and will not, solve the problem of bounded rationality. Nor do they allow us to identify an ordered process of decision-making, involving a 'policy cycle' with a series of stages, beginning with an evidence-based debate about policy problems and ending with an evidence-based evaluation of their solutions. Instead, a focus on rationality and stages prompts us to challenge the assumptions we make about policymaking – such as that it is driven by a small number of policymakers at the 'centre' – and identify a far messier and unpredictable process, in which many actors are involved, and the separation of stages (such as between policy formulation and implementation) is difficult to maintain.

To explain this argument in more depth, I draw on two literatures. The first focuses on the direct insights that policy studies provide to our understanding of EBPM. Much of this literature has been published in the UK and Australia, partly to reflect government trends towards the production of evidence-gathering centres which are expected to work more closely with policymakers. This literature is relatively simple to generate, since almost all of it contains the same basic keywords (such as evidence and policy) and/ or can be found by snowballing from initial texts. These studies highlight the role of the supply and demand for evidence, and the competition that scientists face when presenting evidence to policymakers. They suggest that, to be successful, scientific advocates may need to use persuasion and 'emotive appeals', and form effective alliances with other groups, to generate greater and sustained attention for their evidence.

The second draws insights from the broader policy theory literature, which informs the study of EBPM without making it the primary focus. Most studies identify the role of bounded rationality as a way to understand the psychology of policymaking; to argue that policymakers use imperfect, and often 'gut' or emotion-based, short cuts to gather information and make decisions. This takes place in a complex policy environment, prompting us to understand the rules, networks, and socioeconomic context underpinning policy decisions. This literature is more difficult for the non-specialist to *generate* using conventional searches, since there may be no direct reference to EBPM, and *understand*, because, in many cases, theories have their own language and do not give a proper sense of how the insights from each study or theory relate to EBPM. Yet, understand it we must, since

this literature represents a large part of the accumulated wisdom of policy studies and a way to better understand the role of evidence and policy.

In the penultimate section, I use this analysis to help us reconsider the value of a focus on rationality, stages and cycles. It is tempting to make use of the policy cycle, as a simple way to understand policymaking, compared to the policy theories that present a less orderly process in which it is difficult to engage. Yet, this would be a mistake, unless you come to see the cycle as a series of stages in which evidence-based policies can appear to go off course. In the conclusion, I identify three initial tenets of evidence based policy making, to help produce a more realistic description of how evidence is used in policymaking. This underpins the discussion, in chapter 5, of how evidence *should* be used.

**Comprehensive and bounded rationality**

The idea of comprehensive rationality is that it represents an 'optimal' policy process, at least when we make some, rather unrealistic, assumptions about who is involved, what they represent, and the best way to make policy. The idea of 'bounded rationality' is that we examine what happens when these assumptions or conditions are not met. For example, we initially assume that:

1. *The values of society are reflected in the values of policymakers*. There is a direct link between the policy preferences of the public and those of policymakers. In the real world, elected policymakers receive a limited amount of support from the public, and they try to satisfy many contradictory public preferences. Government is about making choices between competing aims, producing 'winners' and 'losers', and seeking to legitimise those choices. It is not about finding an optimal choice, based on indisputable evidence, which will satisfy everyone.

2. *A small number of policymakers control the policy process from its centre*. Instead, power is shared across many government departments, levels of government, and with a range of quasi-governmental and non-governmental actors (Cairney, 2015a). This insight has practical implications for scientists seeking to supply evidence to the most relevant policymaking venues, and normative implications when we consider who should control the policy process (chapter 5).

The key point is that, even if these assumptions were to hold, there would still be a further series of conditions that would have to be met to ensure a comprehensively rational process (Cairney, 2012a: 96):

3. *We can separate the values, required by policymakers to identify their aims, from the facts produced by organizations to assess the best way to achieve them.* In practice, people make empirical claims infused with their values. Consider extreme examples, in which people argue that the evidence exists to show that men are more intelligent than women and some races are demonstrably superior to others, more routine examples in which people use data to argue that a public service is in 'crisis', or instances in which people combine facts and values to justify action: we talk about the

evidence on problems when we think we have a duty to solve them (Cairney, 2015b). Further, no amount of empirical information can solve debates about the root causes of complex policy problems such as poverty. Facts and values are often hardest to separate when we evaluate the success and failure of policy solutions, since the measures used for evaluation are as political as any other part of the policy process (Cairney, 2012a: 39; McConnell, 2010; Marsh and McConnell, 2010). The gathering and presentation of facts is a political exercise.

4. *An organisation acts optimally by ranking its aims according to its leader's preferences and undertaking a comprehensive search for information*. In the real world, policymakers struggle to make choices between competing aims, and organisations are unable to gather comprehensive levels of information. In practice, policymaker attention lurches from one aim to another, they struggle to process information, and they make decisions in the face of great uncertainty. The injection of more evidence could help alleviate one of these problems but exacerbate another.

5. *Policy is made in a 'linear' way: policymakers identify their aims, the bureaucracy produces a list of all ways to deliver those aims, and the policymaker selects the best solution.* In practice, policymaking is much less ordered and predictable: policymakers often have unclear aims, policy solutions often exist before problems arise in the minds of policymakers, and policymakers often simply legitimise policies made in the past, or select solutions to problems to which they have paid little attention (Cohen et al, 1972).

This final condition – linear policymaking – represents a key part of the post-war policymaking literature. It became customary to identify a series of stages through which a policy might progress, from the initial decision to think about a problem to the point at which its success is evaluated:

- *Agenda setting*. Identifying problems that require government attention, deciding which issues deserve the most attention and defining the nature of the problem.

- *Policy formulation*. Setting objectives, identifying the cost and estimating the effect of solutions, choosing from a list of solutions and selecting policy instruments.

- *Legitimation*. Ensuring that the chosen policy instruments have support. It can involve one or a combination of: legislative approval, executive approval, seeking consent through consultation with interest groups, and referenda.

- *Implementation*. Establishing or employing an organization to take responsibility for implementation, ensuring that the organization has the resources (such as staffing, money and legal authority) to do so, and making sure that policy decisions are carried out as planned.

- *Evaluation*. Assessing the extent to which the policy was successful or the policy decision was the correct one; if it was implemented correctly and, if so, had the desired effect.

- *Policy maintenance, succession or termination*. Considering if the policy should be continued, modified or discontinued (Cairney, 2012a: 33).

Turning this process into the image of a policy cycle gives the impression that the process is continuous: the evaluation of past policy in one cycle often leads to agenda setting in another, as policymakers consider how to change or continue with decisions made in the past:

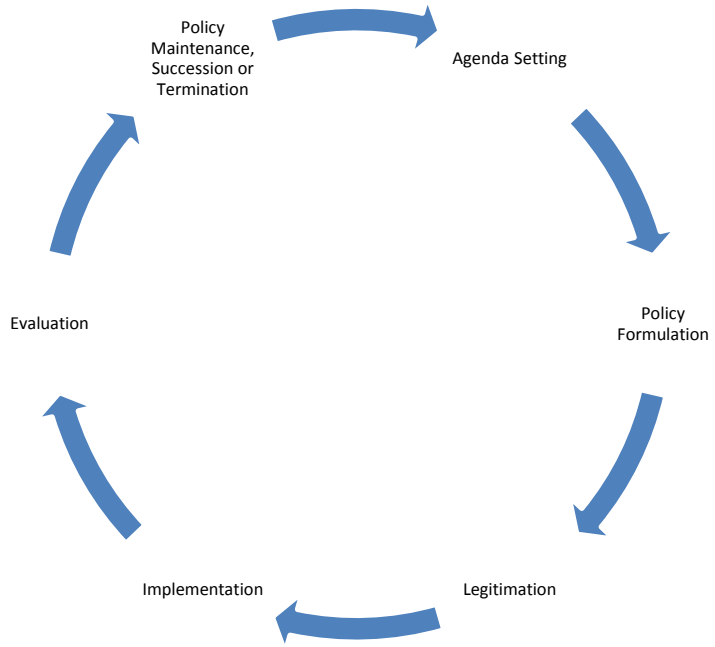


**Figure 1**: *a generic policy cycle* (Cairney, 2012a: 34)

The cycle image remains popular outside of policy scholarship, partly because it is a simple model that can understood by non-specialists, and it can be used by policymakers to describe and prescribe their work (although many different cycle images are used within government, and many do not describe stages - HM Government, 2014; Scottish Government, 2009). However, for most policy scholars and many policymakers, it represents a model that provides a misleadingly simple description of how policy is made (Cairney, 2014a; Lomas and Brown, 2009: 914). It is part of the ideal-type, to be contrasted with more realistic accounts. To continue with the cycle metaphor, modern theories describe something akin to a Spirograph of many interacting cycles, and portray multi-directional arrows linking each stage.

The problem, for scholars and practitioners, is that it is difficult to replace the simple metaphor with the complex picture. Modern theories describe a far messier policy process, and struggle to provide a simple message about how to understand policymaking and seek to influence it (Cairney, 2014a). Yet, this discussion of the ideal-type should help. It allows us to consider how policy is made in the real world, when our assumptions don't hold and conditions are not met. If done in the right way, these limitations, when measured against an artificial standard, prompt us to think about what really happens and how policymakers and scientists should adjust. We identify 'bounded rationality'. Instead of being part of an

'optimal' process, policymakers use heuristics to gather information and seek 'good enough' solutions (Simon 1957: xxiv; 1976: xxviii; Cairney, 2012a: 97-8). Some of this process may involve seeking scientific evidence, some may be about other forms of evidence gathering (such as public consultation), and some involve using trial and error or tried and trusted methods. This process may, at times, appear to be orderly and go through certain stages, only to turn into an unpredictable process in which many cycles and stages (referring to many problems and solutions) interact.

The basic idea, that organisations cannot generate all relevant information, and policymakers cannot process all of the information available to them, underpins the study of public policy. It was the staple of key post-war debates about the 'incremental' nature of policymaking, when policymakers limit their search for evidence to politically feasible policy options (which do not diverge too much from the status quo), make policy in a trial-and-error way, gathering evidence as they go, in a series of non-radical steps, and perhaps measure 'good' policy in terms of the level of consensus it generates rather than simply in relation to evidence (Lindblom, 1959; 1964; 1979; see chapter 5). It is also the starting point to almost all major contemporary policy theories, which explore what happens when boundedly rational policymakers interact with their environments (Cairney and Heikkila, 2014: 370).

**EBPM: a new lease of life for comprehensive rationality**

Policy scholars have begun to identify a worrying trend in the new EBPM literature: the old notion of comprehensive rationality, used to demonstrate what does *not* and *could not* happen in policymaking systems, has received a new lease of life following the rise of the EBPM agenda in countries such as the UK and Australia. The problem is that many new scholars, without a background in policy studies, refer to something very close to comprehensive rationality *uncritically*, seeing it as an ideal, and bemoaning real world policymaking when it does not live up to it. Instead, we should be using the concept of bounded rationality, to highlight the limits of a naïve attachment to EBPM, and to consider how to act accordingly.

Part of the problem is that comprehensive rationality remains an attractive prospect for scientists and, in many ways, policymakers. Boaz et al (2008: 242) describe 'rational analysis' as 'comforting to researchers and, sometimes, to decision makers'. Botterill and Hindmoor (2012: 367) argue that EBPM, as a 'political slogan' and 'academic movement', shares comprehensive rationality's focus on separating facts and values, "to anchor policy-making in evidence and to deliver 'what works' unsullied by ideology or values considerations" (see also Brown, 2013: 3-4; Sanderson, 2002: 5; 2009: 705; 2011: 61; Williams and Glasby, 2010: 98; Australian Bureau of Statistics, 2010; Smith, 2013: 4; Marston and Watts, 2003: 147). This reflects a wider sense that many evidence-based decisions, such as on the allocation of healthcare resources, should be taken out of the hands of politicians driven primarily by the need to remain popular (and allegedly too 'cowardly' to make the right choices – BBC News, 2014).

An attachment to comprehensive rationality may also be based on significant advances in scientific practice, knowledge and systematic review, and the hope that EBPM can help

overcome limitations in government (Botterill and Hindmoor, 2012: 371). Boundedly rational policymakers, who can only gather so much information, can be aided by scientists with far greater capacity. In that context, if there remains a gap between hope and reality, it 'can be attributed to pathologies of the political process; the realities of which are that sound evidence is often pushed to one side … what is missing is not the evidence but the institutional capacity and political will to act upon that evidence' (2012: 368; see also Monaghan, 2011: 30-1). Such a conclusion allows us to blame politicians for general failure and explain specific successes with reference to exceptional individuals in the scientific profession. This is a mistake, based on insufficient knowledge of the policy process. Instead, we should focus initially on problems with the supply of, and demand for, evidence.

*Problems with the supply of evidence*

Botterill and Hindmoor (2012: 370) argue that scientists face many of the problems as policymakers. They cannot separate facts from values and interpretation, their research resources are limited (and often 'contracted out' to policymakers), and any attempt 'to collect and communicate evidence to policy-makers involves distorting that evidence through simplification' (2012: 368; Pawson, 2006: 8-10). Further, they have no 'unique claim to objectivity' (Sanderson, 2002: 6; Ginsburg and Gorostiaga, 2001; Petticrew and Roberts, 2006: 5).

These limitations are often masked with an appeal to a scientific consensus, based on a hierarchy of evidence which favours randomised control trials (RCTs) and systematic review (Botterill and Hindmoor, 2012: 367-8; see also Nutley et al, 2007; 2013; McCaughey and Bruning, 2010; Neylan, 2008; Smith, 2013; Yeomans, 2013; Greenaway, 2008; Thom, 1999: 11-2; 2005; Boaz et al, 2006). Discussions which would be hotly debated within a discipline – particularly when complex issues defy simple cause and effect - become 'self-evident' facts when presented to policymakers, as part of a process in which people use evidence to exercise power (Botterill and Hindmoor, 2012: 371-2). While this public front to present a scientific consensus may be powerful and appropriate in some cases, where the evidence is relatively clear (on, for example, the links between smoking and illness, or evidence of climate change), it is harder to sustain in more complex and nuanced cases where singular 'root causes' are more difficult to identify and policy solutions are hotly contested (for example, the identification of inequalities).

These problems of exaggerating consensus are multiplied when we consider the wide range of ways in which scholars disagree about what they are doing, how they should do it, and how science should contribute to policy (Boaz, 2008: 239). They are exacerbated further when: problems cross-cut traditional policy areas and disciplinary boundaries (Head, 2008: 4; Sanderson, 2002: 15; Downe et al, 2012); the evidence base is patchy or contested (Head 2010: 78; 87; Sanderson, 2011: 69; Taylor, 2013: 12-3; Thom, 1999: 129); and, the evidence comes from abroad, often in an unfamiliar or unsystematic way (Ettelt et al, 2012).

Further, not all academics favour the same hierarchy of evidence (Pawson, 2006: 52-4), and some encourage the wider generation of knowledge from practitioners, service users, interest

groups, and public 'deliberation' to recognise, for example, the distinction between effective and appropriate policies (Williams and Glasby, 2010: 97; Petticrew and Roberts, 2006: 57-9; 68; see also Axford and Pawson, 2014). So, the appearance of an evidence-policy gap is caused partly by a biased and romantic account of the supply of 'the evidence', in which scientists provide an objective account of a problem that cannot be ignored, and a consensus on how it should be solved. In practice, the evidence is contested, and the actors who identify problems may not be in a good position to supply the solutions.

*Problems with the demand for evidence*

Further problems arise when the supply interacts with the demand for evidence. *At times*, EBPM appears to be supported by policymakers in broadly the same way as many scientists. Politicians may try to depoliticise issues by portraying them as technical and/ or resolvable via research and expertise (O'Brien, 2013: 4; Wood, 2015). Note the 'magic' or 'silver bullet' metaphor, to highlight a demand for a killer piece of information to remove the need for political choice (Cartwright and Hardie, 2012: 73-4). Further, some governments, including the UK, seem to privilege particular forms of evidence when providing major funding for academic/ scientific centres, or government units, to determine 'What Works' (Boaz et al, 2008; Head, 2010a: 79; Solesbury, 2001; Haynes et al, 2012; Cameron et al, 2011: 431; for critical reflections, see Parsons, 2002; Sanderson, 2002; Boswell, 2009: 4).

Yet, even if they represent an interested audience, policymakers may not understand or pay attention to 'the evidence' in the same way as the scientists providing it (Botterill and Hindmoor 2012: 369, Head, 2010a: 87; Bambra, 2013; Sutherland et al, 2013; Sanderson, 2009: 703; Boswell, 2009: 33; Ettelt et al, 2012: 493; Rich, 1997; Bédard and Ouimet, 2012; Stoker, 2010: 54; Talbot and Talbot, 2014; Head et al, 2014; Avey and Desch, 2014). For scientists, 'the word evidence is synonymous with research', but for policymakers such as civil servants, it is 'more synonymous with data, analysis, or investigation'; 'evidence' will include 'gray literature, raw data', advice from experts, lessons from other governments, public opinion (Lomas and Brown, 2009: 913) and, in some cases, anectodal evidence of success. This problem of disconnect is compounded when, for example, policymakers are not involved in the evidence gathering process, or scientists focus on one aspect of a multi-faceted political problem (Petticrew and Roberts, 2006: 29-33; Cartwright and Hardie, 2012: 12).

More generally, the problem is compounded by bounded rationality and politics. The cognitive limits of policymakers would be a limiting factor even if they enjoyed the sort of time and space, to reflect on the nature and implications of evidence, which we associate with academics. Yet, the political process encourages them to make decisions more quickly, in the face of uncertainty, while their attention tends to lurch, rather unpredictably, from issue to issue. Consequently, their demand for information may be unpredictable, and their ability to devote sufficient time, to understand the evidence, is very limited. Crucially, *they still make decisions*. This kind of behaviour may be anathema to academics who enjoy the privilege of time. Overall, the disconnect between demand and supply can produce a range of responses with two extremes: at one, policymakers seem to ignore or react inadequately to the

cumulative wisdom of scientists; at the other, they pay disproportionate attention to limited information and act before the evidence is clear.

*The competition for policymaker attention*

Scientists also compete with many other actors to attract the attention of policymakers. *At best*, scientific evidence is one of several relevant sources of knowledge for policymakers. When policymakers want to know 'what works' they refer to what is feasible politically at least as much as the 'technical' feasibility and effectiveness of a policy solution. When they use 'knowledge', it includes their own knowledge of the policymaking system, as well as the 'practical wisdom' of their advisers and colleagues, the professional and 'hands on' knowledge of practitioners, and the insights of service users (Head, 2008: 6; 2010: 87; 2013: 397). *At worst*, some policymakers may be 'populist and anti-intellectual', and others may only demand information to support a policy decision already made (Head, 2010a: 81; 84; Baggott, 2010; Boswell, 2009; Naughton, 2005; Stevens, 2007; Sanderson, 2009: 703; 2011: 61-2). They may also look elsewhere for information – particularly when the issue is salient, new or unpredictable, and when they feel the need to make decisions quickly in the face of uncertainty (Head, 2010a: 81; 2010b: 172).

Somewhere in the middle of these best and worst case scenarios, we find that policymakers treat 'rational policy analysis' as one of many ways 'of telling a story alongside all the other stories in a department' (Rhodes, 2013: 486). Actors may express an attachment to the idea of a predominantly 'evidence based' process, but recognise that the system in which they operate is not always conducive to it.

*'Comprehensive EBPM' exaggerates the evidence-policy gap*

Overall, this literature suggests that the appearance of an evidence-policy gap is exaggerated by focusing on one type of EBPM image, in which the unequivocal evidence comes first and we bemoan a lack of political will or the inability of policymakers to act accordingly. The gap will not seem as wide if we recognise the limits to EBPM, and the policy process may not seem as 'irrational' if we generate a more sophisticated understanding of it.

To this end, it is important to recognise the many other legitimate functions of research and evidence: to inform solutions to a problem identified by policymakers; as one of many sources of information within policy networks; as a resource used by actors, with entrenched positions, to bolster their case; as a tool of government, to show it is acting; and, as a source of 'enlightenment', shaping how people think over the long term (Weiss, 1979). Evidence may be used to help clarify the aims of policymakers, measure how well policy is working, evaluate pilot projects that may be rolled out nationally, support the roll out of pilots as 'prototypes' or beacons of 'good practice', or gather evidence to support performance management (Sanderson, 2002: 9-10; 13; Geyer, 2012). It may be used by governments to legitimise their activities (Sanderson, 2002: 3-5; Monaghan, 2011: 30-1); to make them seem more authoritative or credible (Boswell, 2009: 7-8; 25; 43-5). In each case, it would be naïve to think that the evidence could ever speak for itself or that its producers 'control how their ideas are interpreted, modified and used by others', particularly when issues are salient

(Head, 2013: 397; Monaghan, 2011: 2-4; 37-8). Rather, this is a political process, in which each policy made directly on the basis of research can be seen as a victory, instead of viewing every evidence-policy gap as a defeat.

**EBPM and policy theory: psychological and environmental explanations**

Scientists may provide important policy-relevant information but, if they want to influence how that information is used, they need to know how the policymaking process works. If they have greater knowledge of how policymakers think, and how they operate within a wider complex system, they have a greater chance of being able to intervene in the right place, at the right moment, to influence how much attention their evidence receives, and how it is used by other actors. Policy theory can help.

Policy theory insights are based on the study of boundedly rational policymakers within specific policy 'environments' (Cairney, 2012a; Cairney and Heikkila, 2014; Sabatier and Weible, 2014). A focus on policymakers draws on insights from psychology. A focus on policy environments is necessary to consider what factors influence how people make decisions and what is the effect of those decisions. The choices of policymakers take place within institutions and networks, are influenced by policy context and events, and should be understand through the lens of the beliefs of policymakers and other actors. In some cases, we describe these processes as 'complex', which can just mean complicated, or refer to complex policymaking systems with specific properties (Cairney and Geyer, 2015). Combined, we may focus on the actions of individual policymakers but recognise the factors that constrain their ability to deliberate and make choices.

*The psychology of policymaking*

Our aim is to identify how policymakers interpret rules and adapt to their environment when working with others within organisations, groups and coalitions. To know why people make decisions, we need to know how they think before they act. We need to know how they process and interpret information, using a combination of analytical techniques and emotional responses. We need to know how they align the information they receive with their enduring beliefs about how the world works (and should work). This takes place, for example, during a process of agenda-setting characterised by 'two key statements' (Cairney, 2012a: 183):

- There is an almost unlimited amount of policy problems that *could* reach the top of the policy agenda. Yet, very few issues do, while most others do not.
- There is an almost unlimited number of solutions to those policy problems. Yet, few policy solutions will be considered while most others will not.

Most policy theories are based on bounded rationality, highlighting the important point that people make decisions – to pay attention to some problems and consider a small number of solutions - in a small amount of time despite high uncertainty and ambiguity. Yet, the term 'bounded rationality' often seems insufficient because it could be little more than a truism: people do not have the time, resources and cognitive ability to consider all information, all

possibilities, all solutions, or anticipate all consequences of their actions, so they use informational shortcuts or heuristics to produce what they may perceive to be good-enough decisions (Simon, 1976: xxviii).

'Bounded rationality' perhaps suggests that people may have limited cognitive capabilities but are still goal-oriented and take the time to get decisions right; they deal with uncertainty by trying, as far as possible, to articulate their values, rank their most important policy problems, and seek evidence for the right kinds of solutions. Yet, people also make decisions quickly, often based on emotional shortcuts to make quick judgements with limited information. Kahneman (2012: 20) famously describes two types of thinking ('fast and slow'): '*System 1* operates automatically and quickly, with little or no effort and no sense of voluntary control. *System 2* allocates attention to the effortful mental activities that demand it, including complex computations' (compare with Haidt, 2001: 818 on 'intuitive system' and 'reasoning system').

These insights are an important part of many policy studies, combining a focus on bounded rationality with 'rapid, gut-level, emotion-laden cognition' (Lewis, 2013: 1). Lewis (2013: 4; 7) argues that 'fast' thinking is 'typically where the action is' because people tend to conserve 'our limited amount of attention and cognitive processing capabilities for the few activities we currently view as most essential' and rely on 'autopilot' whenever emotions are heightened. The main effect is a series of biases related to cognitive shortcuts which develop over time as people learn from experience, including:

- the 'availability heuristic', when people relate the size, frequency or probability of a problem to how easy it is to remember or imagine
- the 'representativeness heuristic', when people overestimate the probability of vivid events
- 'prospect theory', when people value losses more than equivalent gains
- 'framing effects', based on emotional and moral judgements over well thought out preferences
- confirmation bias
- optimism bias, or unrealistic expectations about our aims working out well when we commit to them
- status quo bias
- a tendency to use exemplars of social groups to represent general experience; and
- a 'need for coherence' and to establish patterns and causal relationships when they may not exist (2013: 7).

Drawing on Haidt (2007; 2012), Lewis (2013: 9-10) discusses the equivalent of fast thinking when making *emotional or moral judgements*. People draw quickly on 'moral foundations'

related to caring for the vulnerable, punishing cheating, rewarding loyalty, respecting authority, and protecting families and other social groups. This kind of thinking could help explain how policymakers interpret certain kinds of evidence, when, for example, they often seem impervious to persuasion, or they have the motivation to select only certain kinds of solutions when their attention lurches to problems (2013: 19).

Decisions are also influenced by *familiarity or processing fluency*; with the ease in which policymakers process information (Alter and Oppenheimer, 2009: 220, referencing work on the 'availability heuristic' – Tversky and Kahneman, 1973; Schwartz et al, 1991; Schwartz, 2004). They may pay more attention to an issue or statement if they already possess some knowledge of it and find it easy to understand or recall, and may place more value on things they find familiar, even if the less familiar alternative is otherwise identical (Alter and Oppenheimer, 2009: 221-2; 2008: 990). This is a crucial point when we consider that policymakers have too many problems to pay attention to, too many solutions to consider, and too many choices to make, based on more information than they can process. Fluency informs how policymakers restrict their search for information, to reduce choice down to a small number of manageable options.

Overall, 'bounded rationality' suggests that people will use short cuts to information, and pay more attention to some problems and solutions than others. Additional concepts describe *particular* short cuts to explain why *certain* issues receive more attention. 'Social intuitionism' (Lewis, 2013) points to emotional, moral and 'gut' decisions, while processing fluency identifies the importance of issues that are already familiar and seem more concrete or closer to home. These thought processes can be manipulated, to attract attention and potential agreement, from the simple manipulation or repetition of texts and images, to the use of 'priming' messages to influence recall, and presenting concrete versus abstract images of problems (Alter and Oppenheimer, 2009: 227; 2008: 166). Persuasion strategies may be effective not only because they relate to people's beliefs, interests or moral and emotional judgements, but also because they can be processed more easily.

In such cases, 'the evidence' may seem secondary to the ways in which policymakers react to it. They may be receptive not only to particular kinds of evidence – to address the problems to which they pay most attention, and provide solutions consistent with their beliefs or existing knowledge – but also particular ways in which the evidence is 'framed', such as to appeal to the emotions and the familiar (Dearing and Rogers, 1996: 1; Baumgartner and Jones, 1993: 11-2; Kingdon, 1984: 3–4; Cairney, 2012a: 183).

*The policy environment*

This 'fast and slow' thinking takes place in a policy environment which constrains some choices and facilitates others. Broadly speaking, policy theories identify the role of policy environments when they conceptualise the relationship between five key elements of the policy process.

First, they identify a wide range of actors using evidence, making choices and influencing choice. Actors can be individuals or collectives, and collectives can range from private

companies to interest groups to governments bodies (Weible, 2014). A trend in the literature, in the past three or four decades, is to reflect on a broad shift from centralized and exclusive policymaking towards a more fragmented system with a large number of policy participants (Jordan, 1981: 96-100; Rhodes, 1997; Bache and Flinders, 2004a; 2004b). Issues which were once 'quietly managed by a small group of insiders' have now become 'controversial and politicized' (Heclo, 1978: 94–7). This challenges the ideal-type image of EBPM. A focus on the bigger picture shifts our attention from evidence used by elected policymakers at the 'top' to its use by a wide range of actors in a multi-level policy process. It also reminds scientists that they are competing with a wide range of actors to present evidence in a particular way to secure a policymaker audience.

Second, they identify 'institutions', defined as the rules, norms, practices and relationships that influence individual and collective behaviour. Rules can be formal and widely understood, such as when enshrined in law or a constitution, or informal and only understood in particular organisations. Institutions at one level (e.g. constitutional) can also shape activity at another (e.g. legislation or regulation), establish the types of venue where policy decisions are made, and the rules that allow particular types of actors or ideas to enter the policy process (Ostrom et al, 2014; Pierson, 2000). There are many different institutions within governments and government departments, each providing different incentives, to policymakers or organisations, to seek and engage with particular sources of evidence (Cairney, 2012a: 77; Boswell 2009: 11-6; Boaz, 2008: 243). Support for particular evidence-based solutions may vary according to which department or unit takes the lead and how it understands the problem (Cairney et al, 2012: 43; Boswell, 2009: 16).

Third, most theories focus on the role of 'policy networks' ('subsystems'),[1] defined as the relationships between actors responsible for policy decisions and the 'pressure participants' such as interest groups, or other types or levels of government, with which they consult and negotiate (Jordan et al, 2004). To some extent, the development of networks follows government attempts to deal with complexity. To address the sheer size of their responsibilities, governments divide them into broad sectors (such as health or education) and more specialist subsectors (such as tobacco or compulsory education). Senior policymakers delegate responsibility to bureaucrats, who seek information and advice from groups. Groups exchange information for access to, and potential influence within, government. The resulting relationship can be based on the need to specialise: 'issues that are highly complex … require long-term commitment and specialization and partitioning of responsibilities' (Weible et al, 2012: 6). Or, some networks may be more exclusive than others because bureaucracies and other public bodies have operating procedures that favour particular sources of evidence and some participants over others (Cairney, 2012a: 178). For example, a common complaint in the 1970s and 80s was that anti-smoking groups were marginalised by governments in favour of the tobacco industry; now, the reverse is often true (Cairney et al, 2012: 214).

[1] See Cairney (2012a: 179) on the use and meaning of many network terms, such as 'policy communities'. The term 'subsystem' is used more in US theories.

Fourth, theories identify the role of 'ideas', as a very broad term to describe ways of thinking, and the extent to which they are shared within groups, organisations, networks and political systems. It can refer to three intertwined processes. First, an idea can be the proposed solution to a policy problem ('I have an idea'). Second, shared ideas – as beliefs, knowledge, world views, and language - appear to structure political activity when they are almost taken for granted or rarely questioned – as 'core beliefs', 'paradigms', 'hegemony', and 'monopolies of understanding' (Cairney and Heikkila, 2014: 365). Most studies examine how they underpin discussions in particular fields, such as healthcare, while some examine system-wide beliefs on, for example, the importance of economic growth (Hall, 1993; Cairney and Weible, 2015). Third, persuasion, through the manipulation and selective presentation of information, can be used to prompt actors to rethink their beliefs. Overall, well-established beliefs provide the context for a consideration of new evidence; new evidence on, for example, the effectiveness of a policy solution has to be accompanied by successful persuasion to ensure that it is considered properly.

Fifth, they conceptualise the role of context and events. Context is a broad category to describe the extent to which a policymaker's environment is in her control or how it influences her decisions. It can refer to the often-changing policy conditions that policymakers take into account when identifying problems and deciding how to address them, such as a political system's geography, demographic profile, economy, mass attitudes and behaviour (Cairney and Heikkila, 2014: 365). It can also refer to a sense of policymaker 'inheritance' - of laws, rules, institutions, programs, and commitments – when they enter office (Rose, 1990). Events can be routine and anticipated, such as elections, or unanticipated incidents, including social or natural crises or major technological change (Weible, 2014). For example, the role of 'focusing events' (Birkland, 1997) or apparent social or economic 'crises' can prompt lurches of attention from one issue to another, and some forms of evidence can be used to encourage that shift.

*Combining psychological and environmental explanations*

Policy theories can be used to conceptualise the use of information, by boundedly rational policymakers, adopting a range of informational shortcuts (a mix of 'fast' and 'slow' thinking), in a large, messy policy process. In each case, the picture is far removed from the idea that 'the evidence' has a direct input to a small number of comprehensively rational policymakers in a clearly defined policy process. However, policy theories deal with the role of psychology in different ways. For example, some may 'zoom in' to focus on the behaviour of key policymakers. They may seek to 'get into the heads' of policymakers, to use qualitative methods to explore how and why they make particular choices. Other accounts may ascribe the same basic thought processes to a large number of actors, to allow them to 'zoom out' and situate such action within a complex policymaking system over which policymakers have limited control (Cairney, 2012b: 124-5; Geyer and Rihani, 2010).

**EBPM: combining insights from multiple theories of the policy process**

Policymakers have to make decisions in the face of uncertainty. No amount of available information or evidence can settle the matter for them. Rather, they decide who, and what information, to trust. They also make decisions in the face of ambiguity, which relates to the way in which the problem can be understood. People can entertain a large number of ways to understand or think about the same issue, and, since they cannot analyse all issues simultaneously, their attention can lurch quickly from one to another. Consequently, a large part of the policy process regards the use of persuasion to encourage people to think about issues primarily in terms of their positive or negative aspects, or to shift attention to one at the expense of the other (Zahariadis 2014, Dearing and Rogers, 1996: 1; Baumgartner and Jones, 1993: 11-2; Kingdon, 1984: 3–4; Cairney, 2012: 183). Policy theories conceptualise a wide range of aspects of this process, from the use of vignette studies to explain bursts of change following key decisions, to the long term analysis of relatively stable environments in which policymaking takes place.

*Multiple streams analysis*

Kingdon's (1984) focus is on the interaction between two kinds of ideas: the type of policy solution that could draw attention and catch-on very quickly, and the established set of beliefs in a policy network that would slow its progress. He argues that the notion of a new body of evidence or policy solution providing 'an irresistible movement that sweeps over our politics and our society, pushing aside everything that might stand in its path' is misleading because it ignores the conditions that have to be satisfied – during a brief 'window of opportunity' – before a policy will change significantly. Three separate 'streams' must come together at the same time:

- *Problem stream – attention lurches to a policy problem*. Only a tiny fraction of problems receive policymaker attention. Getting attention is a major achievement which must be acted upon quickly, before attention shifts elsewhere. This might be achieved by demonstrating that a well thought out solution already exists.

- *Policy stream – a solution to that problem is available*. While attention lurches quickly from issue to issue, viable solutions involving major policy change take time to develop. Kingdon describes solutions in a 'policy primeval soup', evolving as they are proposed by one actor then reconsidered and modified by a large number of participants, and a process of 'softening', as some issues take time to become accepted within policy networks. To deal with the disconnect between lurching attention and slow policy development, actors such as 'policy entrepreneurs' develop widely-accepted solutions in anticipation of future problems, then find the right time to exploit or encourage attention to a relevant problem (note the phrase 'solutions chasing problems').

- *Politics stream – policymakers have the motive and opportunity to turn it into policy*. They have to pay attention to the problem and be receptive to the proposed solution. They may supplement their own beliefs with their perception of the 'national mood'

and the anecdotal feedback they receive from interest groups and political parties. In many cases, only a change of government may be enough to provide that motive.

Government attention may lurch quickly to a problem, but a feasible solution, acceptable to enough people in the policy network, takes much longer to produce, then longer still to be taken forward by government. Multiple streams analysis is one of several theories that highlight the importance of time. The production of a successful evidence-based solution may take years or even decades to be accepted within a policy community, and it may be longer before policymakers have the motive and opportunity to adopt it. The time it takes for policy to change may seem like an eternity for advocates in the middle of policy struggles, but would be regarded as commonplace to policy scholars.

Kingdon's analysis is also useful to reinforce the distinction between two kinds of evidence-based activity relating to: the size of the problem (for example, the number of smokers and the link between smoking and ill health); and, the effectiveness of the solution (for example, the effect of higher taxes and health warnings on consumption). In each case, the use of evidence can differ markedly. For example, when defining problems, policymakers may ignore epidemiological evidence for years, only to shift their focus and pay disproportionate attention – often when the evidence itself has changed little or not at all. Or, when considering solutions, the evidence of the effectiveness of an intervention competes with beliefs about their feasibility and appropriateness. Therefore, the argument that policymakers ignore the evidence is too simple, and takes no account of the different ways in which people consider evidence in different situations.

*Punctuated equilibrium theory*

Punctuated equilibrium theory (Baumgartner and Jones, 1993; 2009; Baumgartner et al, 2014) highlights two main effects of bounded rationality. First, issues are subject to 'parallel' and 'serial' processing: most policy is processed by government simultaneously in a large number of small and specialist subsystems, which address issues at a level of government not particularly visible to the public, and with minimal involvement from senior policy makers. Only some issues are dealt with, sequentially, at the 'macropolitical' level (True et al, 2007: 158–9). Second, policymakers ignore most issues and promote relatively few to the top of their agenda.

This lack of attention to issues helps explain why most relationships within subsystems, and policies, may not change very often. Policymakers and certain groups develop a 'monopoly of understandings', in which there is one dominant way to understand a problem, and only certain groups have the knowledge and expertise to make a regular contribution. Change can happen when actors within subsystems receive new evidence and reconsider their views, but it is not inevitable or a routine occurrence. There is also the constant *potential* for 'macropolitical' attention to lurch, and for these intense periods of attention to destabilise relationships and prompt new ways to frame policy problems. It can happen when excluded groups engage successfully in 'venue shopping'; to challenge a monopoly in one venue (such as a government department) by seeking an audience in another (such as a legislature, the

courts, or other type or level of government). Yet, policymaking can remain stable for extended periods before this occurs.

Again, this image of time contrasts with the idea of a killer piece of evidence having an instant impact. Subsystems can be a source of stability, power and policy continuity for decades. In this context, actors use evidence as a resource, to frame policies in a way that supports or challenges often-well-established relationships within government. Framing is one part evidence and one part emotional appeal, and our focus is on the *use*, rather than the *properties*, of evidence (True et al., 2007: 161).

*The social construction of target populations*

Policymakers may reinforce quick, emotionally biased, judgements with selective information to 'institutionalize' their understanding of a policy problem and its solution. For example, 'social construction theory' examines policy design in relation to 'target' groups and populations - the good groups entitled to rewards and the bad groups deserving of burdens or punishments (Schneider and Ingram, 1997; Schneider et al, 2014). The focus is on agenda setting – framing, assigning values, and using ideologically driven and emotional characterizations of people and problems: 'Likes and dislikes are not the result of individual or collective reason and deliberation but mainly the product of emotion and heuristics … judgments begin with emotional reactions … and reason is used mainly to justify initial emotion responses' (Schneider and Ingram, 2014, drawing directly from psychologists such as Haidt, 2001[2]; 2012).

A key aim is to examine the effect of policy design, in the past, on current debates. For example, a sequence of previous policies based on a particular framing of target populations may produce 'hegemony', when the public, media and/ or policymakers take for granted, and rarely question, that framing. Policy designs based on emotionally-driven thinking become hegemonic because they are 'automatic rather than thought through'; as a 'decision heuristic', an emotional assignment of 'deservingness' is 'easy to use and recall and hard to change' (2014).

Past policy, based on this thinking, represents the main context for current policymaking. The distribution of benefits is cumulative, influencing future action by signalling to target populations how they are described and will be treated. For example, older people may be favoured by spending programmes and given great incentives to engage regularly in politics, and both factors reinforce each other. Social constructions are difficult to overcome, since policy and strategy may reinforce hegemony continuously, based on a dominant interpretation of social groups and how to treat them (Pierce et al, 2014). Some, particularly well-resourced, groups can challenge how they are categorised, but this may take decades in the absence of a major external event, such as an economic crisis or game-changing election,

[2] Haidt (2001: 814) draws on the idea of intuitionism (people grasp moral truths as a form of perception, not reflection) to suggest that 'moral reasoning is usually an ex post facto process used to influence the intuitions (and hence judgements) of other people'; one has an instant gut response to certain issues and 'when faced with a social demand for a verbal justification, one becomes a lawyer trying to build a case rather than a judge searching for the truth'.

perhaps exploited by 'entrepreneurs' to change the way that policymakers and the public view particular groups (Schneider and Ingram, 2005: 444; Pierce et al, 2014).

This is the context in which evidence is received favourably or rejected. Indeed, a common concern for campaigning groups, in areas such as welfare reform and criminal justice, is that they have a choice between remaining on the fringes of policy debate, to stick to their principles about how policy problems should be understood and addressed, or accept the agenda of government, which characterises populations in a particular way, to have a better chance of influence. We move from the production and sharing of evidence to the need to frame the evidence in a way that is attractive and acceptable to policymakers.

*The narrative policy framework*

The narrative policy framework examines the role of stylised accounts of the origins, aims and likely impact of policies. It focuses on perception and the social construction of problems to 'create different policy realities'. Narratives are used strategically to reinforce or oppose policy measures. Each story has a setting, characters, plot and moral. Narratives can be compared to marketing, as persuasion based more on appealing to an audience's beliefs than the evidence. People will pay attention to certain narratives because they are boundedly rational, seeking shortcuts to gather sufficient information – and prone to accept simple stories that confirm their biases, exploit their emotions, and/ or come from a source they trust (see Stone, 1989; 2002).

McBeth et al (2014) identify groups competing to present the most compelling narrative within subsystems, and 'macro level' institutions, in which successful narratives become embedded in the culture of policy systems. Context is important, as the factors that actors have to account for when constructing narratives ('legal and constitutional parameters, geography, scientific evidence, economic conditions, agreed upon norms'), and compared to the 'props' or setting for a play that can be taken for granted or, at times, dominate attention. Events are treated primarily as resources, used to construct narratives and apportion blame. The emphasis is on persuasion – in the context of uncertainty, ambiguity and the role of 'fast and slow' thinking – rather than the 'objective' use of evidence.

*The advocacy coalition framework*

The 'advocacy coalition framework' (ACF) suggests that boundedly rational individuals 'simplify the world through their belief systems', people engage in politics to turn their beliefs into policies, and they form coalitions with people who share their beliefs (Jenkins Smith et al 2014). A large number of actors with similar beliefs become part of the same 'advocacy coalition' – a metaphor to describe a 'non-trivial degree of coordinated activity' (Sabatier, 1988: 139) and opposition to the beliefs and policies of competing coalitions (Sabatier and Jenkins-Smith, 1993). There are three main types of belief. 'Core' are fundamental and, like a religious conversion, unlikely to change in the studied time period ('a decade or more') but also too broad to guide detailed policy (such as one's views on human nature). 'Policy core' are specific enough to guide activity but still unlikely to change (such as fundamental beliefs in favour of, or opposition to 'fracking', based on attitudes to the

economy and environment). 'Secondary aspects' relate to the implementation of policy. They are the most likely to change, as people learn about the effects of, say, regulations versus economic incentives.

Coalitions compete with each other to dominate how policy is made, and problems are understood, within subsystems. They compete fiercely to interpret evidence, particularly when they romanticise their own cause and demonize their opponents (Sabatier et al, 1987). The ACF's primary focus is on: (a) how coalitions interpret and respond to events; and (b) policy learning, and the revision of secondary aspects of coalition beliefs. Learning takes place through the lens of deeply held beliefs, producing different interpretations of evidence in different coalitions.

Evidence-based policymaking is a highly-charged political process – coalitions selectively interpret information and use it to exercise power. In some cases, there are commonly accepted ways to measure policy performance. In others, it is a battle of beliefs where coalitions 'exaggerate the influence and maliciousness of opponents' (Weible, 2007: 99). Technical information is often politicised and a dominant coalition can successfully challenge the evidence supporting policy change for years – even if the new information seems self-evident to scientists (Cairney, 2007).

*Studies of policy transfer, diffusion and learning*

Evidence of success from other countries or regions is a key source of inspiration for new policies in an 'importing' country. One can engage in trial-and-error based on one's own experience and/or seek evidence from other governments that have more experience. Indeed, this seems like a good way to deal with bounded rationality: allowing some governments to innovate so that others can emulate. However, there are significant practical obstacles which undermine the role of evidence within that process. They are highlighted by Cairney and St Denny (2014; drawing on Rose, 1993; 2005), who identify criteria to be sure that the importation process is evidence-based, when deciding (a) if the external project was a success, (b) we know why it succeeded, and (c) that we are confident the success can be replicated in other countries:

1. The project was introduced in a country or region which is sufficiently comparable. Comparability can relate to the size and type of country, the nature of the problem, the aims of the borrowing/ lending government and their measures of success.

2. It was introduced nationwide, or in a region which is sufficiently representative of the national experience (it is not an outlier).

3. Sufficient attention is paid to the role of policy implementation and the potential risks to transferring the policy to another region without local 'ownership'.

4. Sufficient attention is paid to the role of scale, and the different cultures and expectations in each policy field.

5. The project has been evaluated independently, subject to peer review and/ or using measures deemed acceptable to the government.

6. The evaluation is of a sufficient period of time in proportion to the expected outcomes.

7. We are confident that this project has been evaluated the most favourably – i.e. that our search for relevant lessons has been systematic, based on recognisable criteria (rather than good publicity and reputations).

On that basis, in the study of the importation of 'prevention' policies in the UK, they found that almost no projects met the criteria. In practice, ways to determine success are rarely clear, and people judge success based on limited evidence. In each case, the "leap from 'quality of evidence' to 'decision to apply' can never be a simple technocratic choice. It will necessarily involve judgement and political considerations" (Nutley et al, 2013: 14).

In broader terms, the diffusion literature suggests that governments, faced with the need to make decisions quickly in the face of uncertainty, often emulate others without gathering enough evidence to learn, in sufficient depth, about why they are perceived to be successful (Berry and Berry 2014). It suggest that there are five main explanations for policy diffusion: learning; imitation; normative pressure (a perceived need to follow others); competition (particularly to keep taxes and regulations low); and coercion. In other words, only one focuses on evidence gathering as a primary explanation. This is broadly consistent with the larger policy transfer literature which, one the one hand, highlights the role of 'epistemic communities' containing networks of experts to spread evidence (Haas, 1992), and entrepreneurs 'selling' evidence-based policies from one government to another (Cairney 2012a: 263), but, on the other, the role of external pressure, international obligations and perceived need to keep up with international norms, to explain policy transfer based on limited evidence gathering and meaningful learning (Dolowitz and Marsh, 1996; 2000; Ettelt et al, 2012). In other words, policy transfer is primarily a political exercise based on the selective use of evidence to set the agenda and import one's favoured policy solutions.

*Complexity theory and complex systems*

Advocates of complexity theory describe it as a new scientific paradigm providing new ways to understand, and study, the natural and social worlds (Mitchell, 2009: x; Mitleton-Kelly, 2003: 26; Sanderson, 2006: 117). This link between natural and social sciences is valuable, since it allows us to describe policymaking systems in a way familiar to scholars, without a policy science background, studying complex systems in areas such as climate change and healthcare (Kernick, 2006; Paley, 2010). The simple message is: if you recognise the role of complexity in your own scientific research, recognise complexity in mine. The more complicated argument is that complex systems have common properties, including:

1. *A complex system is greater than the sum of its parts*. Those parts are interdependent - elements interact with each other and combine to produce systemic behaviour. In

politics, the 'nodes' tend to be people or organisations and they interact by sharing information and following rules.

2. *Some actions (or inputs of energy) in complex systems are dampened (negative feedback) while others are amplified (positive feedback)*. Small actions can have large effects and large actions can have small effects. In politics, this is a key feature of agenda setting, in which policymakers often ignore or pay disproportionate attention to issues.

3. *Complex systems are particularly sensitive to initial conditions that produce a long-term momentum or 'path dependence'*. In politics, path dependence refers to the idea of 'historical contingency' or ' the extent to which events and decisions made in the past contributed to the formation of institutions that influence current practices' (Cairney, 2012a: 76). It suggests that when a commitment to a policy has been established and resources devoted to it, over time it produces 'increasing returns' (when people adapt to, and build on, the initial decision) and it effectively becomes increasingly costly to choose a different path (Pierson, 2000; Room, 2011, 7-18).

4. Systems exhibit 'emergence', or behaviour that results from the interaction between elements at a local level rather than central direction.

5. They may contain 'strange attractors' or demonstrate extended regularities of behaviour which may be interrupted by short bursts of change (as described by punctuated equilibrium theory) (Cairney and Geyer, 2015; Cairney 2012b: 124-5; Geyer and Rihani 2010).

In policy studies, the identification of a complex system is often used to give advice about engaging in policymaking (Teisman and Klijn, 2008: 288; Blackman, 2001; Cairney, 2012b: 349; Sanderson, 2006; 2009). For example, it warns against the assumption of law-like behaviour and the idea that evidence of success in one context will mean success in another. The idea of 'emergence' also has a particular significance, because it highlights outcomes based on the interaction between many actors, often in the absence of central government control – which makes it difficult to know how, and to whom, to present evidence and to predict the impact of evidence-based policy (Cartwright and Hardie, 2012: 162-9).

**A brief return to the policy cycle: it looks useful, but remains misleading**

This focus on 'emergence' links strongly to the vast literature on implementation and governance (Cairney, 2012b; Hill and Hupe, 2009). At first glance, this may suggest that a focus on stages and cycles is useful after all, to highlight the importance of travelling through a series of policymaking steps. Indeed, a focus on the implementation stage extends this analysis, to highlight the conditions that would have to be met to ensure implementation success (Cairney, 2012a: 35):

1. The policy's objectives are clear, consistent and well communicated and understood.

2. The policy will work as intended when implemented (it is based on the identification of the correct cause of the problem).

3. The required resources are committed to the programme.

4. Policy is implemented by skilful and compliant officials.

5. Dependency relationships are minimal (central government does not rely on too many other bodies for its policy's success).

6. Support from influential groups is maintained.

7. Conditions beyond the control of policymakers do not significantly undermine the process (such as unpredictable events and major socioeconomic shifts).

However, as with the policy cycle, these conditions are generally highlighted in policy studies to say what does *not* happen. The conditions are there to help explain why things go wrong.

Perhaps more importantly, these conditions, and the cycle itself, betray a 'top down' perspective on policymaking. They suggest that policy begins and ends with the decision of a central government policymaker, and that any departure from this process is a problem. This perspective may be descriptively inaccurate and prescriptively problematic (I discuss the latter in chapter 5).

An alternative 'bottom up' perspective developed, in part, to challenge the assumption that central government is the main influence on policy outcomes (Cairney, 2012a: 37). For example, Lipsky (1980) argues that policy is, to a large extent, made by the 'street-level bureaucrats' (including teachers, doctors, police officers, judges, and welfare officers) who deliver it. Bureaucrats are subject to an immense range of, often unclear, requirements laid down by regulations at the top, but are powerless to implement them all successfully (1980: 14). Instead, they use their discretion to establish routines to satisfy a proportion of central government objectives while preserving a sense of professional autonomy necessary to maintain morale. The link to the EBPM agenda is clear: if Lipsky is correct, scientists need to make sure that their evidence is understood and used by street level bureaucrats as well as central policymakers.

Similarly, Hjern (1982: 213-6) argues that the assumption that policy is controlled by a single central actor, with consistent aims, exacerbates not only policy failure but also the *perception* that something is wrong with the system. Inattention to the complexity of implementation causes difficulties in the administration of policy, producing feelings of powerlessness when no one seems to be in charge. Instead, we should recognise *intra-departmental conflict,* when central government departments pursue programmes with competing aims, and *interdependence*, when policies are implemented by multiple organizations – many of which will be in the private or third sector. Programmes are implemented through 'implementation structures' where, 'parts of many public and private organizations cooperate in the implementation of a programme'. It is difficult to force decisions on actors within the

structure who are employed by other organizations, so it is unrealistic to think that a sole central actor could secure its own aims and objectives irrespective of the actions of the others involved. Although national governments create the overall framework of regulations and resources, and there are 'administrative imperatives' behind the legislation authorising a programme, the main shaping of policy takes place at local levels by implementation structures in which national considerations may play a small part (Hjern and Porter, 1981: 213; see also Barrett and Fudge, 1981: 4; Barrett, 2004; Colebatch, 1998: 30).

This identification of top-down and bottom-up approaches produced considerable debate about how best to describe policymaking, and what implications these studies had for democratic process. Although the debate was never resolved, and it moved on partly to the study of 'governance' (Cairney, 2009a), or was superseded by theories such as the ACF, it reinforces the importance of a focus beyond a small number of actors within central government. A focus on the cycle, and top-down implementation, may give the impression of an ordered and hierarchical policy process. In contrast, the focus of policy theory on power diffusion across many levels and types of government (and shared between public and private actors), complexity theory's focus on 'emergence', and the identification of 'bottom up' elements to policymaking, all highlight the importance of local action.

*The link to EBPM is clear*: it could be a mistake to focus all of your energies in trying to get elected central government policymakers to pay attention to your evidence, adopt your preferred solution, and assume that it will inevitably be carried out, as if on a cycle with straightforward stages, from evidence based problem identification towards evidence based solution evaluation. In many cases, the most relevant evidence-adopters will be operating at multiple levels of government, stages will appear to interact in a disorderly way, and policy will be made as it is carried out, by bodies that may not report directly to central government.

**Conclusion: key tenets of EBPM in the real world**

The policymaking literature explains why there cannot be a direct and unproblematic link between scientific evidence and policy decisions and outcomes. Indeed, using the ideal-type of 'comprehensive EBPM', we can identify the conditions required to minimise an evidence-policy gap:

- it is possible to produce a scientific consensus based on an objective and comprehensive account of the relevant evidence
- the policy process is centralised and power is held by a small number of policymakers
- scientific evidence is the sole source of knowledge for policymakers
- policymakers understand the evidence in the same way as scientists
- policymakers have the motive and opportunity to turn the evidence into a solution that is consistent with, and a proportionate response to, the policy problem.

In the real world, the evidence is contested, the policy process contains a large number of influential actors, scientific evidence is one of many sources of information, and policymakers base their decisions on a mixture of emotions, knowledge and short cuts to gather relevant evidence. This takes place in a policy process containing networks which have their own rules on who, and what sources of evidence, to trust, and often a 'monopoly' on how to understand problems. Attention to particular kinds and sources of evidence can lurch unpredictably, as events prompt policymakers to shift their focus quickly, or ambiguity and uncertainty contributes to shifting attention to different policy images. The use of evidence is a political process; an exercise of power to characterise people and problems, and to justify beliefs and decisions. Policymakers use scientific evidence in a stylised way before making major decisions.

We can use these insights to generate three initial tenets of evidence based policy making:

1. *Even if 'the evidence' exists, it doesn't tell you what to do*. Scientists may exaggerate scientific consensus on 'the evidence' when they become advocates. Sometimes they provide clear evidence of a problem but are often not in the best position to provide a solution. The evidence may tell us that a solution is effective, but not if it is appropriate. In many cases, scientists providing evidence want an instant impact, but their impact may be more subtle, taking years or decades to filter through

2. *The demand for evidence does not match the supply*. Governments may fund research to seek a 'magic bullet' or killer piece of information to remove the need for political choice. Yet, research studies often focus on the narrow, measurable aspects of interventions while policymakers consider complex problems in an often highly charged political atmosphere. Policymakers pay attention to, or understand, the evidence in different ways than scientists. Their demand for information may be unpredictable. They seek many sources of information – scientific, practical, opinion – to make decisions quickly and despite uncertainty. They also use research selectively: to bolster their case, legitimise their actions, and show that they are acting.

3. *Policymakers make choices in a complex policymaking system in which the role of evidence is often unclear*. The policy process contains many policymakers and it takes time to understand how the system works. Attention to evidence may lurch unpredictably following shifts in the policy environment. Support for evidence-based solutions varies according to which department or unit takes the lead and how it understands the problem. Bureaucracies and public bodies have operating procedures that favour particular sources of evidence and some participants over others. Well-established beliefs provide the context for a consideration of new evidence. Perhaps most importantly, scientists are competing with a wide range of actors, often more knowledgeable of the policy process, to secure a policymaker audience and present evidence in a particular way.

## Chapter 3 Health and advocacy: what are the barriers to the use of evidence in policy?

Chapter 2 identifies a *general* problem with naïve accounts of EBPM based on minimal knowledge of the policy process. In health policy, there is often a *specific* problem: a greater expectation that the evidence-policy link is direct and linear; and, far greater potential to be disappointed with the real world. Although I trace EBPM debates back to older post-war discussions of rationality, medicine has its own, more recent, history and an alternative source of lessons and expectations (Oliver et al, 2014b). The evidence based medicine (EBM) agenda is to: (a) gather the best evidence on health interventions, based on a hierarchy of methods which favours, for example, the systematic reviews of randomised control trials; and, (b) make sure that this evidence has a direct impact on healthcare practice, to exhort practitioners to replace bad interventions with good, as quickly as possible (2014b: 1; Dobrow et al, 2006: 1815-6; Kok et al, 2012b: 715; Mitton et al, 2007: 757). This approach is often at odds with the ways in which policymakers use evidence:

The tools and programs of evidence-based medicine - critical appraisal, Cochrane-style systematic reviews, practice guidelines, audit and feedback, computer reminders, and so on - are of little relevance to civil servants trying to incorporate evidence in policy advice (Lomas and Brown, 2009: 906).

One should not exaggerate the top-down nature of EBM, since key proponents describe it as 'integrating individual clinical expertise and the best external evidence' to encourage the 'conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients' rather than an attempt to remove clinical discretion: 'it requires a bottom up approach that integrates the best external evidence with individual clinical expertise and patients' choice' (Sackett et al, 1996: 71; see also Greenhalgh et al, 2014). In many ways, it simply provides a condensed form of information for doctors unable to keep up with the literature. Further, different practitioners will have different expectations about the exact nature of evidence gathering, and speed of likely behavioural change.

However, they also share the same EBM ideal – that we can produce the best evidence on which practitioners should draw. Further, healthcare practitioners have increasingly developed, or are subject to, centralised decision-making and performance management mechanisms to further that agenda (Lomas and Brown, 2009: 905; albeit, the centralisation may come from government bodies – Chalkidou et al, 2009).

In turn, these expectations provide a lens through which to view dissatisfaction with EBPM: practitioners may compare their *EBM ideal* with *EBPM in the real world.* The EBM agenda underpins three unrealistic expectations for the policy process: that policymakers adhere to the same hierarchy of scientific evidence; that 'the evidence' has a direct effect on policy and practice; and, that the scientific profession, which identifies problems, is in the best place to identify the most appropriate solutions, based on scientific and professionally driven criteria. A focus on EBM suggests that, even if there is a long way to go, we know where we want to travel. For example, people may point to the widely-known story – that 'it takes an average of

17 years for research evidence to reach clinical practice' (Morris et al, 2011: 510) – and respond by seeking to minimise the time-lag by generating the best evidence and providing ways for like-minded practitioners to act on it more quickly. As in the 'pure problem-solving model', the assumption may be that we can generate 'a clear and shared definition of the problem, timely and appropriate research answers, political actors willing to listen, and the absence of strong opposing forces' (Stoker, 2010: 53; Elliott and Popay, 2000: 467).

Instead, a focus on EBPM, viewed through the lens of policy theory, shows us what we can reasonably expect to happen to evidence when every part of the process – including defining the problem, deciding how to generate the best evidence, and identifying solutions – is contested. Policymakers draw on many forms of evidence; evidence informs debates, rather than acting as a way to resolve them, and the evaluation of policy solutions is a political exercise (McConnell, 2010) even if governments aim to make them 'technocratic' (Marston and Watts, 2003: 148). People seeking solutions to the time-lag between scientific evidence and policy face a different context, in which they compete for attention rather than dominate the supply of information.

Perhaps the most illuminative example is the role of the randomised control trial, often described as the 'gold standard' in EBM but not in Canadian policymaking circles, where: 'fairly high levels of policy analysts report never having heard of RCTs' (Bédard and Ouimet, 2012: 625; see also Stoker, 2010; Green and Gerber, 2003; Ferlie et al, 2012: 1300; Marston and Watts, 2003: 146-7). This knowledge may also vary markedly, with most government departments showing relatively low awareness compared to health or other departments linked to medicine (2012: 634). Similarly, in Norway, the process to generate evidence-based government reports differs markedly from the processes of systematic review that we associate with EBM (Innvær, 2009: 8).

This context underpins the study of EBPM by scholars without a professional background in policy studies and/ or scholars examining the perceptions of practitioners in fields such as healthcare and public health. There is now a large literature, on the barriers to the use of research evidence in policy and practice, from a practitioner perspective. Only a small proportion makes reference to theories of the policy process. For example, Embrett and Randall's (2014) systematic review of the literature on the social determinants of health/health equity, and the barriers to encouraging governments to adopt 'healthy public policies', identified 6200 peer review articles published since 2002, of which *seven* 'explicitly used a commonly recognized policy analysis theory to inform their analysis' (2014: 147). Further, all of those seven articles 'misused' policy studies by only focusing one one aspect of a theory. This problem is reinforced by a more general lack of awareness of policy scholarship, in which practitioners draw on older concepts such as the policy cycle and stages approach (Oliver et al, 2014b: 4), largely rejected by policy scholars (chapter 2; Cairney, 2014a), and seen by civil servants as 'a description of an "ideal type," useful largely as a baseline from which to document deviations' (Lomas and Brown, 2009: 914; see also Cameron et al, 2011: 443; Hanney et al, 2003: 23).

Many of these studies are based on the perceptions of scientists trying to influence the policy process (Oliver et al, 2014a: 9; Lomas and Brown, 2009: 914). They are largely descriptive or inductive, without giving the sense that respondents are in a knowledgeable position, and without a serious attempt to construct a theory driven research question. This seems incongruent with the image of medical-scientific practice, as a process of theory driven hypothesis testing, and with social scientific policy scholarship, which has generated a wide range of theory-driven studies. Consequently, there is a missed opportunity in two ways: by the researchers producing narrow studies on EBPM; and, by the policy scholars who could have made a contribution to research design and benefited from the access to respondents.

From this literature, it is not clear what to do about the barriers that scientists identify, or if the alleged solution would improve the use of evidence. If we do not draw on theories which tell us how the policy process works, we do not know how the partial 'removal' of one or more barriers will improve the links between evidence, policymaking and policy. Or, the barrier may be too amorphous to remove in any meaningful way – as, for example, an evidence-policy gap based on the division between scientist and policymaker cultures (Oliver et al, 2014b: 6) which, in any case, is at odds with most policy theories which identify regular interaction through networks (Smith and Joyce, 2012: 58). Nor is it clear just how realistic the respondents are; if they compare the real world EBPM with an EBM ideal that has no direct comparator in the policy process. Perhaps most importantly, scientists may simply not know how, and to what extent, policymakers use scientific evidence (2014b: 6).

On the other hand, like the policy cycle discussed in chapter 2, these studies are relatively clear and simple. They are relatively easy to turn into a hypothesis to be tested; or to link to an initiative or intervention. The identification of the problem often implies a simple solution. In contrast, policy studies often identify messy policy processes that often seem to be unpredictable or to defy logic. It is not always clear how to make sense of the policy process in a practical sense; to conceptualise EBPM barriers in a way that practitioners can understand and act upon. Consequently, there is great potential for a combination of approaches, to supplement empirical studies with theory, and to develop the practical potential of the policy sciences, most of which is not designed specifically to guide practitioners.

To this end, the chapter initially provides a critical analysis of the 'barriers' literature, building on the work of Oliver et al (2014a; 2014b) to show, in greater depth, where the gaps in our understanding are and how policy theories can help fill them. It presents a comparison with policy studies to help develop a more theoretically informed set of explanations for the gaps between evidence and policymaking.

The second part of the chapter shows how these links have been, or can be, developed, in quite different ways. First, a focus on tobacco control shows us the difference between the evidence on the nature of the problem (for example, the number of smokers and the link between smoking and ill health) and the effectiveness of the solution (for example, the effect of higher taxes and health warnings on consumption). I discuss a relatively mature advocacy project, in which attention has shifted largely from establishing the size of the problem

towards gathering evidence on the effectiveness and implementation of solutions. Tobacco has become a model for policy change in several other areas, partly because it shows what it takes to turn evidence into major policy change.

Second, a focus on implementation science and improvement science raises important issues regarding where scientists should seek influence: from central policymakers ostensibly in charge of policy, to the organisations influencing policy as it is implemented. In improvement science, there is an important emphasis on 'bottom up' implementation, to generate local 'ownership' of policy solutions tailored to specific populations. This approach challenges the idea that evidence generated at the 'top' should filter down to practice at the bottom.

The common theme to both case studies is that they address the links between evidence, policymaking, solutions and policy outcomes in a pragmatic way. In particular, the tobacco experience demonstrates that major evidence based policy change may require a sustained period of advocacy that goes far beyond the solutions provided in barriers research.

**The barriers to EBPM: insights from health studies and policy theory**

Oliver et al's (2014a) systematic review draws insights from 145 studies, on the 'barriers to and facilitators of the use of evidence by policymakers', published from 2000-12 (including 13 other systematic reviews going back further). 126 studies examine health related policymaking and 35 examine other policy areas (the overlap is caused by a small number of comparative studies). About three-quarters are studies of the UK, Canada, US, and Australia. From this analysis, they identify the five most frequently identified barriers and facilitators. I supplement this body of work by zooming in on key articles (identified by Kathryn Oliver) and using a snowballing technique to trace the key texts on which these studies are often based.

Systematic reviews suggest that there is often a stated or implied solution to specific barriers. These solutions are limited in value, since the research is often based on practitioner perspectives (often through surveys), and interviewees may not be in a good position to know what the most important barriers are. Imagine, for example, that many focus their efforts on the point of central government decision rather than the longer term process: overcoming one barrier to that small part of the process may not be the solution (Oliver et al, 2014a: 10). In broader terms, there is often a general reference to differences in 'culture' between scientific and policymaker communities (at least in the UK), without these studies or respondents being in the position to provide a good understanding of policymaking culture (Oliver et al, 2014b: 2-4). Only a small proportion refer to barriers in relation to the properties of the policy process, such as Ettelt and Mays' (2011: 57) comparative study of health services research which points to the fragmented/ decentralised nature of government, the competition between political parties and interest groups to use evidence to their ends, and the lack of incentives for scientists and policymakers to engage with each other, alongside more traditional explanations related to a lack of funding and support for research.

In table 3.1, I list these barriers and solutions in the left hand column. Although there are five categories, three are really part of one problem: the supply of evidence. The further three

columns take insights from policy theory to: help explain the problem; note the further problems that empirical practitioner studies may not identify routinely, and consider what solutions can be identified from policy studies (I expand on this discussion in chapter 5).

In most cases, the solutions derived from policy theory are general and often relatively abstract; it would be unrealistic to expect one detailed blueprint to apply to 'the policy process' when processes and events vary markedly from issue to issue, place to place, and over time. The cost of general and more realistic analysis is a drop in simplicity, to reflect the complex and often unpredictable nature of policymaking. Therefore, the hope for an engagement blueprint is as unrealistic as the hope for comprehensive EBPM, and cannot be found in any of the literature: Lomas and Brown (2009: 917) [i] and Oliver et al (2014b: 2) identify similar problems in the barriers literature; Lavis et al (2003) provide a very broad 'toolkit' to measure research impact; and Mitton et al (2007: 756) present a similar conclusion on knowledge transfer & exchange – there is a large literature recommending it, but 'actually very little evidence that can adequately inform what KTE strategies work in what contexts', and with little appreciation of the vagaries of the policy process.

Further, some terms that are becoming increasingly common to practitioner and policy studies are not clear. For example the identification of a 'knowledge broker' in practitioner studies[ii] is as problematic as the widely used but little understood term 'policy entrepreneur' in policy studies (Cairney, 2012a: 271-2). So, an ostensibly simple recommendation (for example, use a knowledge broker, or 'co-produce' knowledge with policymakers, practitioners and service users) may, on its own, have little practical value.

**Table 3.1: Barriers to the use of evidence, and their solutions**

| Top barriers (number reported) and solution | Possible explanation(s) | Problems to note | Practical advice |
|---|---|---|---|
| 3 problems with demand and supply: *Availability and access to research* (63) - improve dissemination strategies<br><br>*Clarity/ relevance/ reliability of research findings* (54) - improve dissemination strategies<br><br>*Costs* (25) – provide more resources for | Scientists produce evidence, but not in a form that is known about, read, or understood by (or persuasive to) policymakers.<br><br>The quality of the supply of evidence is important. Quality can refer to the format of the information, the extent to which any recommendations are seen as non-partisan/ unbiased, their source | It is difficult to know why policymakers may be unaware of, or uninterested in, the research.<br><br>Effective 'dissemination' is about more than plain and 'punchy' language or shorter reports across many formats.<br><br>Other actors are more experienced at | Adopt framing strategies<br><br>Recognise complexity<br><br>Become part of advocacy coalitions<br><br>Be clear on: (a) why actors should pay attention to the problem raised by the evidence; (b) how feasible is the solution. |

| | | | |
|---|---|---|---|
| dissemination | (trusted experts), and informed by knowledge of political and policy process constraints. | responding to government agendas at the right time, paying more attention to language and persuasion. | |
| *Timing and opportunity* (42) - develop better contacts and relationships, or collaborate, with other practitioners and policymakers | The system is unpredictable.<br>Advocates could not exploit a 'window of opportunity' for policy change, often because they were not aware of it. | It can take years/ decades for feasible solutions to develop and be coupled to problems and politics – but the window of opportunity can open and close in weeks. | Adopt a long term strategy, producing solutions in anticipation of attention to problems<br><br>Identify policy entrepreneurs with the skills to use evidence and influence policymakers |
| *Policymaker research skills* (26) – encourage policymakers to be more aware of the need for robust evidence | Policymakers are flawed – they are unaware of, or choose to ignore, evidence. Practitioners may be describing bounded rationality without a clear sense of the shortcuts that policymakers use. | It is difficult to disentangle the specific idea of 'skills' from the broader reasons why policymakers pay attention to some information and ignore others. It is not clear who are the policymakers – are they elected? | Engage in subsystems which feed evidence up to elected policymakers<br><br>Identify policy entrepreneurs<br><br>Identify who makes decisions throughout the political system, and recognise the need to 'co- |

| | | | |
|---|---|---|---|
| | | | produce' solutions |

Source: column 1 adapted from Oliver et al's (2004: 6) 'Table 1 Most frequently reported barriers and facilitators of the use of evidence'.

**Problems with demand and supply**

Three categories - availability/ access to research, clarity/ relevance/ reliability of research findings, costs - overlap considerably, since they refer to the relationship between the supply of, and demand for, evidence. The need to disseminate high quality information effectively is the most reported source of barriers and solutions to the use of evidence (2014a: 6; see also Bédard and Ouimet, 2012: 629; Lewig et al, 2010: 477; Mitton et al, 2007: 737). Practical barriers relate to the lack of time, managerial support, resources and incentives for scientists to engage in dissemination work, combined with a lack of appropriate support from professional bodies more engaged in politics. In some cases, studies report good results following their use of a well-developed dissemination strategy – including, in some cases, the use of 'tailored, targeted messages' and the use of 'knowledge brokers' who specialise in the translation of evidence to policymakers (Dobbins et al, 2009: 1; Oliver et al, 2014a: 6). In others, specialists work with policymakers or commissioners to help clarify aims and make decisions in areas with a lack of information on the effectiveness of solutions to identified problems (Chambers et al, 2012: 142; Chalkidou et al, 2009: 352).

Yet, we should not form the impression that, if scientists had more time and money to spend explaining their evidence, or could pay someone to publicise it, it would necessarily feed into the policy process. This would be to ignore the importance of demand for information, at a certain time and in a particular form – to solve a very specific problem (that may not be covered in depth by existing studies). Dissemination strategies could help some policymakers become more familiar with the work, but not more interested in it, or more able to understand it enough to know why it would be relevant to their aims.

Rather, the focus of policy studies is on the links between evidence and framing: to combine facts with emotional appeals, or tell stories which manipulate people's biases to apportion praise and blame (True et al., 2007: 161; McBeth et al, 2014); and, to understand evidence through the lens of the pre-existing beliefs of actors within coalitions, some of which dominate policy 'subsystems' (Sabatier and Jenkins-Smith, 1993; Smith and Joyce, 2012: 58), and which are often based on gut reaction and emotional assessments of policy problems (Schneider et al, 2014). This takes place in a complex system, or unpredictable policy environment, in which many actors are involved at many levels of government, in which different 'frames' may dominate, and the uptake and use of evidence varies.

*The value of long term political strategies*

In that context, scientists face a potentially major choice between short and long term strategies: to rely, *if possible*, on a 'knowledge broker', who is able to translate 'raw' evidence into information that will attract the attention of policymakers; or, to engage directly in policymaking on a major scale, to form alliances with policy advocates in the long term, and to build up relationships and trust within government (Mitton et al, 2007: 754). Only with the latter strategy will practitioners get a sense of how policymakers such as civil servants seek to gather and use evidence and, therefore, how practitioners can adapt (Stoker, 2010: 57). Scientists may also have to cultivate trust within government - to become a *credible* source of expertise, with credibility relating as much to behaviour as knowledge – to ensure that policymakers come to experts when they need information quickly. In some cases, civil servants form close networks, based on mutual trust and a shared understanding of the policy problem, with the people or groups providing regular information and advice (Jordan and Cairney, 2013; Haynes et al, 2011: 583; de Goede et al, 2010: 7-8; Hanney et al, 2003: 8 – although such relationships can be undermined by the turnover of policymakers or lack of government capacity - Haynes et al, 2011: 593; Lewig et al, 2010: 478). Further, by engaging with other participants, such as like-minded interest groups, scientists can generate a better sense of who to speak to, when to engage, and how to attract attention for evidence by framing it to fit with policymaker priorities and beliefs.

Some frames can be identified quickly. For example, in countries such as the UK, a story about a policy solution is generally more powerful if framed in terms of its demonstrable value for money (Petticrew et al, 2004: 813; Cameron et al, 2011: 440), particularly since groups will compete for attention with (or compete with others when lobbying) powerful government funded bodies, such as NICE, which measure the effectiveness of healthcare interventions in relation to cost (Chalkidou et al, 2009: 353-4; compare with the *lack* of focus on cost-effectiveness regarding HIV in Tanzania – Hunsmann, 2012: 1479).

Other frames take time to understand, such as the agenda-setting 'scientific policy facts' described by van Egmond et al (2011: 34): the standardised measures, arising from regular discussions between policymakers and scientists, which 'incorporate all kinds of (invisible) normative assumptions' (see also Elliott and Popay, 2000: 466). Or, it may simply take time to know who you are up against; how, for example, the injection of evidence to encourage policy change will affect the balance of power within organisations (Ferlie et al, 2012: 1302; Hobin et al, 2012: 109) and often be resisted by key players (Smith and Joyce, 2012: 58-9). A successful framing strategy won't stop politicians making policy quickly, or solve the problem of constrained budgets, but it could influence *how* policymakers think quickly and respond to constraint.

Perhaps most importantly, a long term strategy is important because it takes a long time to identify the most important policymakers (at multiple levels of government) and influence them enough to (a) shift their beliefs underpinning policy priorities and (b) become motivated enough to make major policy changes.

For example, scholars identifying health inequalities and/ or the need for long term public health measures will generally be trying to influence policymakers who are: sympathetic to 'biomedical solutions' to health problems (Embrett and Randall, 2014: 151; Smith and Joyce, 2012: 63); and, reluctant to make major changes, such as redistributive taxation or shifting resources from acute to primary services. They will struggle to present feasible solutions to policymakers, because health inequalities have multiple causes, there is great uncertainty about the effectiveness of solutions, solutions require major coordination across government departments in a notoriously fragmented system (Exworthy, 2008: 319-20; Hobin et al, 2012: 102; Smith and Joyce, 2012: 65), containing a series of government 'silos', and it is relatively difficult to demonstrate the cost-effectiveness of many interventions (Petticrew et al, 2004: 813).

This contrasts with healthcare in which policymakers face unpredictable crises that often prompt them to adopt simple solutions - invest resources in healthcare, promise to reform organisations, use performance measures to demonstrate success - at short notice (and based on very patchy evidence on healthcare effectiveness – Chalkidou et al, 2009: 352). Inequalities may only receive sufficient elected policymaker attention when those politically-driven healthcare reforms are complete or seem to be working, and health inequalities policies receive less practitioner attention since they are less well linked to important government targets or local budgets (Blackman et al, 2012: 52-5; 58; 60). Long term policy solutions will also span multiple terms of government, and advocates need to persuade policymakers to produce cross-party solutions that will not be undermined after each election.

Further, health inequalities policies involve moral choices about who should benefit from public policy, and the use of evidence may be ineffective unless combined with well-coordinated advocacy involving a wide range of groups (Embrett and Randall, 2014: 153; van Egmond et al, 2011: 31; Lewig et al, 2010). In this context, it takes time to get to know how to influence the ways of thinking of policymakers; to know how to address the lack of direct 'policy relevance' in much health inequalities research (Petticrew et al, 2004: 815). This investment of time is not the norm in health inequalities scholarship (Hunter, 2009: 283).

The appropriate strategy will also vary considerably, depending on the kind of evidence under consideration. For example, the supply of evidence on the nature of a problem – such as the relatively straightforward links between smoking and ill health, or complex links between socioeconomic factors and health inequalities – may be fairly routine, and picked up episodically by policymakers. The evidence on policy solutions is generally more complicated, since knowledge of the likely effectiveness of an intervention becomes tied up in wider political or practitioner knowledge about how appropriate and feasible it may be (Hanney et al, 2003: 10; Hobin et al, 2012: 107), as well as more fundamental questions about who should decide what to do (2012: 108).

Consequently, the quality of evidence can be evaluated in numerous ways, including: the ways in which scientists may value evidence (based on the clarity of the research question, method, rigour, reception during peer review, and publication/ dissemination in high status venues); the format of the information (can it be understood and appreciated by policymakers

and the public?); and, the ways in which policymakers may value evidence, such as the extent to which any recommendations are seen as non-partisan or otherwise unbiased and weighty (to allow policymakers to depoliticise issues with reference to scientific evidence), and informed by actors with enough knowledge of political constraints or the policy process to propose feasible solutions.

**Timing and opportunity**

Many studies describe the sense that evidence is not presented at the correct time. An intuitive response to this problem is to develop good political contacts, so that practitioners can be notified as soon as possible when issues come up unexpectedly, and be in a position to have a meaningful input (Oliver et al, 2014: 4; Lomas and Brown, 2009: 920). This presupposes that an issue will indeed come up when, in fact, problems may never arise on the policy agenda without a successful campaign, crisis, or 'focusing event' (Birkland, 1997). The attention of policymakers to problems has an indirect relationship to the available evidence on their size; some problems can be ignored despite pressing evidence, while attention may lurch to problems without much evidence of a shift in severity. In that context, Kingdon's multiple streams analysis (MSA) is used in some practitioner-focused policy theory articles (e.g. Avery, 2004; Howie, 2009; Pralle, 2009), because it captures the idea that policymaking seems to be serendipitous and unpredictable (it is also easy for a non-specialist to understand – Cairney and Jones, 2015[iii]).

MSA identifies three main problems for the advocates who have a pressing desire to make quick and radical change based on new evidence on the effectiveness of a policy solution: (1) agenda setting takes time - they are competing with many groups to get policymakers to pay attention to the problem they raise; (2) the solutions they present have to be 'softened', to make them feasible within policy networks - which can take years or decades; and, (3) it may not be obvious how best to exploit a window of opportunity in which to propose that solution, and ensure that policymakers have the motive and opportunity to select it.

In those circumstances, the general advice may be to: (a) work with like-minded groups to generate interest in the problem to which the evidence relates (and be ready to act quickly when policymakers suddenly become interested and demand information); (b) adopt a realistic, long term strategy, to work with a wide range of practitioners and policymakers to turn an initial idea into a workable policy solution; and, (c) identify the 'policy entrepreneurs' with enough knowledge of the political system to know how and when to exploit the opportunity to have it adopted (Hinchcliff et al, 2011). Entrepreneurs tend to be the people who know when to act, rather than people who can manipulate policy processes to make things happen.

This recommendation contrasts markedly with the idea of short term knowledge transfer, in which scientists pass on the knowledge and expect policymakers to act quickly. Instead, a quick turnaround would only happen in the other direction, when elected policymakers suddenly demand evidence on problems and solutions and expect the information in a few days (Lomas and Brown, 2009: 912), and/ or when policymakers seem determined to act in

the face of uncertainty (Hobin et al, 2012: 105; Lewig et al, 2010: 475), which further reinforces the idea that solutions have to exist long before problems arise on the policy agenda.

**Policymaker research skills**

In this category, policymakers are allegedly at fault for having insufficient skills to recognise the importance of, or understand, the research. They are unaware of, or choose to ignore, key evidence. In this case, practitioners may be describing specific needs: for a more scientifically trained civil service analytical team, to build up 'receptive capacity' in government (Bédard and Ouimet, 2012: 640; Lewig et al, 2010: 474); for measures to respond to instability, and the loss of institutional memory, when civil servants or ministers move around government; or, for policymakers to generate a clearer research question when they commission or seek evidence (Cameron et al, 2011: 440-2). In one case, Flitcroft et al (2001: 1040) suggest, rather problematically, that the elected government produced a 'not evidence-based' version of policy when it rolled out a more modest screening programme compared to the proposal generated by expert committees. In that case, the use of evidence seems all or nothing, which is a perspective also betrayed by some of Smith and Joyce's (2012: 62) interviewees, who express disappointment that, although they may engage regularly with policymakers, not all of their ideas are taken on board (see also Lewig et al, 2010: 479). This position is to reject the idea that other forms of knowledge or evidence are as relevant to policymaking – and criticised by Marston and Watts (2003: 145; 157), who argue that scientific evidence, and experts, generally enjoy a privileged position within policy networks, which often allows them to pursue their values while enjoying the status of detached observer.

It also contrasts somewhat with the perspective from policymakers that they use research, and expert researchers, *routinely*, to generate ideas within government departments, clarify research, give advice, act as intermediaries between science and policy, give weight to policy decisions (since the public tends to trust scientists more than politicians), help reject bad policies, sell good policies and persuade actors in government (and the media) of their merit, and inform public debate (Haynes et al, 2011: 572-83). This often takes place when the evidence base is patchy and hard to access (and sometimes contradictory - Lewig et al, 2010: 472) and there is a greater reliance by policymakers on politically aware experts. They describe this relationship as generally mutually beneficial, particularly when experts are 'political accomplices' rather than 'disinterested technical advisers' (2011: 591). The comparison suggests, to some extent, that the problem is with the metaphor of evidence *based* which, for some, suggests that scientific evidence is the sole determinant of policy.

Or, practitioners may be describing the broader problem of bounded rationality - policymakers have to ignore the majority of the information 'signals' that they receive because they can only process a small proportion (Lewig et al, 2010: 471) – and a frustration that *their* evidence is ignored. As an aggregated 'barriers' category, it is difficult to disentangle the specific idea of 'skills' from the broader reasons why policymakers pay attention to some information and ignore others. In such cases, we need more information on

how and why policymakers take particular shortcuts when processing information, since one can easily address a policymaker's temporary ignorance of certain information, but find it harder to change the shortcuts they use to dismiss certain sources or types of information routinely.

In this category, we need to identify the knowledge scientists have of the policy process when they criticise its failings. For example, they may be bemoaning the relatively limited attention and skills of senior elected policymakers – producing at least two relevant gaps in their knowledge. First, the policy studies literature suggests that policy is made routinely within networks of civil servants and participants such as interest groups. If they can access the right networks, they may be less dissatisfied with the more routine process of policymaking that underpins elected policymaker decisions. In this case, they can engage independently, as part of a profession, or as part of an advocacy coalition. A coalition may be made up of actors which engage at multiple levels of government, or multiple influential 'venues'. If so, a key part of an evidence dissemination strategy is to influence one's allies - to reinforce their cause with robust evidence and give them further motivation to pursue it - as much as policymakers.

Second, policy is made, or at least influenced, as it is being delivered. Or, governments delegate policymaking responsibilities to other levels of government, public bodies, local commissioning bodies and, in some cases, networks of bodies charged with working together in cross-cutting areas. In such cases, it may be more valuable to share evidence directly with practitioners, even if this produces a large amount of duplication, far more work (Learmouth, 2000; Gkeredakis et al, 2011; Nilsen et al, 2014), very uncertain outcomes, and some difficulties in taking general conclusions from local experiences. For example: Chambers et al (2012: 145) describe a pragmatic, and often 'intuitive', process to help local funding bodies commission specialist services, by clarifying their aims and making sense of incomplete evidence; Elliott and Popay (2000: 466) describe the need for regular dialogue when research alone 'won't provide answers' and is supplemented by local consultation and value judgement; Lewig et al (2010: 470) argue that the evidence from the literature is more likely to be taken up if it chimes with the 'tacit knowledge' of practitioners; Gkeredakis et al (2011: 301) highlight the need to 'co-produce' knowledge between scientists, policymakers and practitioners, to turn it into something to be used in the latter's professional practice; although Kothari et al (2005: 123) report that co-production does not necessarily increase the uptake of knowledge by practitioners; while Dobrow et al (2006: 1821) explore the obstacles to combining a focus on evidence with the generation of local consensus.

The conclusion, each time, may be 'this worked, this time, in this area'. If the underpinning assumption is local variation, the general, concrete implications will be difficult to identify in systematic review. This is particularly true in case studies of 'co-produced' policies which blur the dividing line between an intervention and the context in which it is implemented (Kok et al, 2012b: 716-8). Policy becomes a mixture of transferable solutions, policymaking processes, and, unless the same combination of solution and process are used each time (which seems counter to the spirit of co-production), it also becomes something that is difficult to describe, compare and transfer.

**Case study: lessons from tobacco control**

Tobacco control demonstrates the important interplay between evidence and four main 'stages': to identify a problem, propose a solution, implement the solution, and evaluate its effectiveness. However, it also exposes the limitations to a focus on stages, either because the gap between certain stages has been 20-30 years, or, in some countries, the stages take place in a different order. There is not a linear progression from problem identification to evaluation, and the history of tobacco control highlights major lags between the acceptance of a problem in government and the motivation to introduce a proportionate solution. This is not a problem that could have been solved simply by removing 'barriers', such as to improve the supply of evidence or 'skills' of policymakers.

In countries such as the UK there is now a 'comprehensive' tobacco control policy which seeks to minimise smoking, combined with a new 'endgame' agenda to end smoking completely (Cairney and Mamudu, 2014). At the global level is the World Health Organisation (WHO) Framework Convention on Tobacco Control (FCTC), ratified by 178 states (and the EU), and signalling a major commitment to comprehensive controls by combining a series of measures:

- price and tax measures to reduce demand for tobacco
- protection from exposure to secondhand smoke in enclosed public places
- regulation of product ingredients and disclosure on ingredients
- health warning labels
- measures to improve health education and public awareness
- banning tobacco advertising, promotion and sponsorship
- providing smoking cessation services
- prohibiting the illicit trade in tobacco products
- banning tobacco sales to under 18s
- litigation against tobacco companies in some countries (Mamudu et al, 2015: 5).

Tobacco control is an exemplar for the study of EBPM because it demonstrates positive and negative aspects of the link between evidence and policy. On the plus side, the identification of a policy problem, through scientific evidence linking smoking and then passive smoking to severe ill health, produced a government response, followed by a series of evidence-based solutions which have been evaluated and their lessons spread to other countries. In 'leading' countries this was largely an incremental process, in which governments adopted new policies or strengthened old policies over time. The evidence of solution effectiveness has been disseminated globally (a process led increasingly by the WHO), culminating in a major global policy.

However, *the process has taken several decades*. It remains a useful model, largely to introduce a sense of perspective about how long it takes to go from the publication of evidence on a problem to what epidemiologists, medics and public health advocates may feel is a proportionate response. Initially, we can break this process down into familiar 'stages'.

*Agenda setting and problem definition*. The first acceptable studies of smoking and health were published from the 1950s (Doll and Hill, 1950; Doll, 1998), but it took at least a decade for the science to become accepted meaningfully in the medical profession, before key UK and US publications – most notably by the (UK) Royal College of Physicians in 1962 and the US Surgeon General in 1964 - began to set the agenda for policy intervention (Studlar and Cairney, 2014: 520). During this period, the push for tobacco control was not straightforward, because this 'framing' of tobacco, as primarily a health problem, competed with several others: tobacco began as a glamorous product used by a large proportion of the population, with minimal relevance to government; it continued as an economically valuable product, providing jobs, exports and major taxation revenue; and, as the health framing became more prominent, it competed with a civil liberties argument focusing on the right of people to engage in unhealthy behaviour.

Even in 'leading' countries, these images took decades to challenge successfully, with advocates focusing increasingly on passive smoking, addiction at an early age (to challenge the image of smoking as a choice), and the economic harms associated with ill health, expensive healthcare and low productivity (Cairney, 2007a: 80; Petticrew et al, 2004: 813). Advocates would also draw on country-relevant frames, such as 'secular morality' in the US (Cairney et al, 2012: 133) and, in the UK, smoking as the biggest cause of health inequalities (HM Treasury and Department of Health, 2002). In many countries, this project was only successful because groups engaged in 'venue shopping', seeking more sympathetic audiences (such as the courts, different government agencies, new congressional committees, or even supranational bodies) when frustrated by their lack of progress in some parts of government. The quantification of the US process by Baumgartner and Jones (1993: 114) is instructive, since they chart a major shift in public, media and policymaker attention to tobacco, from low and positive to high and negative, *over four decades*. Further, this process has only happened in a relatively small number of countries. In many others, tobacco is still viewed within government as an important economic product (Mamudu et al, 2015).

In other words, there has perhaps been a major scientific consensus for five decades that tobacco represents one of the major causes of preventable illness and death in the globe, but this evidence can take decades to produce an effect in some countries, and have a relatively small effect in others. Further, the evidence did not speak for itself. Major change from the 1980s, in 'leading' countries, also relied on supportive developments, such as a major shift in the capacity, campaigning and persuasion strategies of medical and public health groups, and a major reduction in smoking prevalence.

*Solutions*. Studlar and Cairney (2014: 520) identify a series of phases through which post-war policy has progressed, including the rise of health concerns from the 1950s, 'regulatory hesitancy' from the 1960s and more meaningful tobacco control from the 1980s, culminating

in a ‘comprehensive’ approach in some countries. For example, in the UK, early policy was characterised by a series of measures that would now be described by public health groups as ridiculously limited: adding filters to cigarettes to give the impression that toxic ingredients would be filtered out; introducing ‘low tar’ brands; and maintaining a range of voluntary schemes with the industry to (ostensibly) reduce advertising and smoking in certain places. Only from the 1980s did we see a major strengthening of policy instruments to, for example, provide stark health education messages and raise taxes for public health reasons. Even then, it took decades to produce a modern control regime with legislation to ban advertising and smoking in public places.

This slow development is reminiscent of Kingdon’s idea of ‘softening’ policy solutions to increase their technical and political feasibility (see also Smith, 2013 on the ‘chameleon like’ nature of ideas). Even today, policymakers describe the need for incremental strategies, to introduce tobacco controls in a series of steps, to gather evidence on less restrictive measures and lay the groundwork for greater control (Cairney, 2007b: 49-51). This is as much to do with how conducive political environments are to change as evidence of the effectiveness of certain solutions, particularly since there is still uncertainty about the effect of tobacco controls in the countries which adopt them first. Indeed, one driver for a ‘comprehensive’ approach is the uncertainty about which instruments work most effectively and the extent to which they work in combination with other instruments. This is, to a large extent, a trial and error process.

We can see this process of softening, to some extent, in the initial adoption of bans in smoking in public places. Until countries such as Ireland decided to legislate to introduce a comprehensive ban in 2004 (after experimenting with voluntary policies to regulate smoking in some areas - Studlar, 2015; Currie and Clancy, 2010), the most common approach was to introduce restrictions incrementally, beginning with public buildings and ending with restaurants, bars and clubs (Cairney, 2007a: 83). Now, after a major push in many countries, the agenda is moving slowly to areas, such as in private cars and the grounds of public spaces, that governments would not have considered before. A mainstream discussion of a tobacco ‘endgame’ would have been unthinkable even 10 years ago.

We can also witness this need to adapt to political feasibility when examining the introduction of solutions in countries which traditionally had more limited controls. For example, in 2014, the South Korean government introduced a combination of solutions – backed up by evidence generated in leading countries, disseminated by the WHO, and included in the FCTC – and, while they don’t go as far as policy in the UK (for example, the cost of cigarettes doubled, but to a level well below costs in the UK), they are currently more controversial. In such cases, the evidence on the size of the global problem, and the effectiveness of solutions, is largely the same, but it is used in a remarkably different way; the political feasibility differs markedly over time and place. So, countries learn and transfer policies from other countries, but have to adapt the same solution to different circumstances.

*Implementation and evaluation*. At the global level, the FCTC is based on current knowledge about the effectiveness of tobacco control instruments, following evaluation in a small

number of countries. It is now at the implementation stage, which demonstrates marked variations in the speed and substance of policy instrument adoption. Put simply, the countries already 'leading' tobacco control have implemented the FCTC most quickly, while progress is relatively slow in countries that did not have extensive tobacco control regimes.

This experience shows that, although this is ostensibly a process of policy implementation, it resembles, to all intents and purposes, the process we see in agenda setting and policy formulation. The adoption *and* implementation of policy choices takes place in policy environments that are more or less conducive to meaningful policy change. In leading countries, and at the global level, actors pursuing strong tobacco control policies have a favourable policy environment: the government accepts the scientific evidence on smoking and passive smoking; health departments take the lead; their operating procedures favour a public health framing of tobacco and consultation with public health groups at the expense of the industry; and, the socioeconomic context is conducive to control (tobacco is not seen as a crucial economic product, prevalence is low, and opposition to control has diminished). In others, the environment is less supportive: the evidence, on the scale of the problem and the effectiveness of solutions, is still contested; health departments compete with finance, agriculture and trade; public health groups compete with the tobacco companies for influence; and the socioeconomic context may be an obstacle (tobacco may be seen as an aid to economic growth, prevalence may be rising, and opposition to control may still be significant) (Mamudu et al, 2015: 15).

*The order of stages*. In other words, the same evidence regarding the problem and effectiveness of solutions is held and promoted by the WHO, but its uptake and use varies dramatically across the globe. If we follow the policy cycle image, implementation may look like an advanced stage of the process. Yet, if we focus instead on the role of policy environments, we may identify a series of stages that blend into each other. In many countries, the agenda setting debate on the size of the problem may still be taking place at the 'implementation' stage, and the adoption of solutions may be slow or non-existent, even though the country's leaders have agreed to ratify and implement the FCTC.

*Tobacco policy as a model*

One emphasis in the public health literature is on the possibility that our experience of tobacco control in some countries can accelerate the evidence-policy process, to close the gap between the identification of a problem and the implementation of a solution. This was certainly one aim of the FCTC, to address tobacco in many countries before they faced the 'epidemic'. It is also a feature of the wider public health field: tobacco control is now often described as the model for further action, at least to address, more quickly and effectively, other 'non-communicable diseases' (NCDs) in alcohol and obesity policy (Cairney and Studlar, 2014).

Yet, our analysis suggests that the evidence-policy gaps are not solely based on gaps in knowledge and experience, or on the absence of an evidence-driven identification of a major problem and plan of action to solve it. Rather, the use of evidence in policy is linked

inextricably to the environment in which policy choices are made. The reduction of 'barriers' to EBPM represents one small piece of the puzzle.

The tobacco experience suggests that the scientific evidence was a resource used by public health advocates during a *decades-long struggle* to form alliances, challenge vested interests, engage in a 'battle of ideas', encourage major social change, shift policymaking responsibility to a more sympathetic department, and persuade governments to completely rethink the ways in which they understood the tobacco issue. This is a long distance from the idea that, to close the evidence-policy gap, you need to produce shorter reports in plain language, employ a knowledge broker, and encourage policymakers to think more like scientists.

**Case study: implementation and improvement science**

Imagine two extremes of the evidence gathering process: at one is the EBM approach with a hierarchy of methods, focused on precise scientific measurement of problems and the effectiveness of solutions; at the other is practice-based evidence-gathering based, for example, on individual service user feedback and professional anecdotes about good practice, in a field where professionals may seek long term outcomes which are difficult to measure with precision. It may be too much to argue that they represent two distinct cultures, but the identification of this spectrum shows that exponents of EBM may face a different policymaking context when they engage in social policy.

In EBM, RCTs and systematic review may represent the 'gold standard' but, in communities of civil servants seeking research, or professions focused more on everyday practice, they may have only a limited influence, because, for example: the research does not relate directly to the *problem as defined by policymakers*; and, it is perceived by the organisations and practitioners delivering policy to relate only indirectly to the specific circumstances of their local areas (Bédard and Ouimet, 2012: 625; Petticrew et al, 2004: 813; see also Morris et al, 2011: 510). Green and Gerber (2003: 96; 101) identify several barriers to the greater use of RCTs in politics, including: their tendency to 'speak to causal questions a few variables at a time', rather than 'complete explanation'; our inability to manipulate or control the real-world settings in which policy experiments might take place; and, the sense that a trial, focused on a small number of causal factors most conducive to controls, and conducted in one place and time, would not be generalizable to wider experience (see also Bédard and Ouimet, 2012: 628; Dobrow et al, 2006: 1817).[iv]

Perhaps more importantly, the people responsible for making or delivering policy in local areas may *think* that such RCT evidence does not apply to their area. It is this *perception* that undermines the spread and uptake of evidence without a concurrent focus on the development of local 'ownership'. In some cases, this problem might be addressed by the design of RCTs specific to those areas, in partnership with practitioners – although the practical barriers are huge, partly because an RCT would require cooperation across many levels and types of government and randomisation is a 'hard political sell', at least to elected policymakers who rely on an image of certainty when they propose policies (Stoker, 2010: 51-2). There is also

much scepticism, within some practitioner circles, about RCTs representing the 'gold standard' – perhaps expressed through shared narratives to undermine their status, such as the '17 years' claim to highlight the gaps between evidence and implementation, and the famous spoof publication on RCTs to gauge the benefits of parachutes (Smith and Pell, 2003).

Yet, one does not need to be sceptical of RCTs or a hierarchy of evidence to pursue local-level EBPM. For example, the Cochrane Collaboration (in Dobrow et al, 2006: 1812) highlights the need to take into account local policy conditions and decision-making practices rather than treat international evidence as universally applicable, and there has been a recent shift of emphasis to generate insights from the evidence of diverse policy implementation experiences (Hobin et al, 2012: 101). Further, Dobrow et al (2006: 1811) explore a global standard and set of methods 'for identifying, interpreting, and applying evidence in different decision-making contexts', recognising two different fields: international EBM, in which there is a hierarchy of methods to generate best practice; and local decision-making processes, in which the aim may be to generate a range of perspectives from specialists, policymakers and stakeholders, often based on an unclear evidence base, a greater focus on economic and political feasibility, and/or far less adherence to the hierarchy as the basis for decisions (2006: 1816-8; see also Ferlie et al, 2012: 1300). In more straightforward terms, we need to make sure that the evidence produced by scientists, and the consequent strategies produced by governments, can be turned into something that makes sense to, and can be incorporated into the practices of, the practitioners delivering policy (Gkeredakis et al, 2011: 309). This may have to happen before the evidence is clear; evidence may be gathered while an intervention, tailored to a local area, takes place (Hobin et al, 2012: 105-6).

In that context, practitioners may promote a pragmatic response, to: draw on what they consider to be the best available evidence at that time; and, to experiment with ways to take it forward in local areas. This allows them to act more quickly and adapt to evidence as it becomes available and, perhaps more importantly, generate a sense of 'ownership' among local areas in which policy is being delivered. This approach may be broadly described as 'improvement science' (Cairney, 2015; King's Improvement Science, 2015).

For example, this basic approach has some traction within the Scottish Government, and it has been used in a select group of issues, including patient safety and the 'Early Years Collaborative' (EYC). The EYC is coordinated by the Scottish Government, which presents some basic evidence-based insights – such as that educational attainment rises if parents read stories to their children before bed – and encourages nursery/ school staff to work out how best to relay the information to parents and encourage behavioural change. The simple rule of thumb is that if it works, continue (and 'scale up', or extend the programme to more people), and if it doesn't, try something else. This 'something else' may be provided by the experience of other groups trying out similar policies in different ways, and relaying the results through the EYC network. This is an experiential form of local evidence gathering by practitioners, combined with a hands-off approach from the 'top', that seems to contrast with the image of top-down RCT adoption and 'fidelity' to programmes (Cairney, 2015c; Hobin et al, 2012: 106). The gathering of evidence at a larger scale then takes place, to generate a sense of which programmes work best when the results can be compared in a reasonably systematic

way (although there is a clear tension between encouraging local actions and measures of success, and central coordination to share best practice and measure overall success). At this stage, *the practice often comes before the evidence is clear*, and practitioners adapt their programmes when new evidence becomes available. This is also a contrast to RCTs, since there are generally no control groups and there is little sense of an experiment in which we can demonstrate clear cause and effect. Rather, the focus is on a pragmatic use of available evidence and the generation of local 'ownership'.

*The links between policy theory and policy in practice*

The links to chapter 2 are clear: advocates of this approach argue that we need to move away from the idea that policy is made from the top down; that the best evidence, derived from 'gold standard' methods, feeds directly into the top, and its insights are used in a straightforward implementation process at the bottom. If policy is a messier process, involving multiple actors and levels of government, and it seems to 'emerge' from the interaction between actors at local levels, we need some way to inject evidence into *that* process. This is likely to involve the participation from a large number of people who may not know what an RCT is or what the results of a systematic review are. However, they are able to take the basic insights and apply them to their local areas, considering the specific problems they face and their resources at hand. In such cases, practitioners value trial-and-error, respond to problems quickly and adapt solutions as they are implemented locally, and recognise an alleged tendency for local policymakers to be sceptical about evidence gathered in other areas.

This focus on a mix of approaches can also be linked to insights from the policy literature (see chapter 2), such as the emphasis in some policy transfer studies on the potential risks to transferring the policy to another region without local 'ownership', and the different cultures and expectations in each policy field that ward against the assumption of a one-size-fits-all approach.

It is perhaps most apparent in the study of complexity, which advises policymakers to learn from experience, use trial and error, and give local actors the power to adapt to their environment (Cairney 2012a: 128; Sanderson 2009: 708; Haynes 2008: 326; Quirk 2007: 369; Little 2012: 7-8; see also Gkeredakis et al, 2011: 302). In contrast to the caricature of EBM as a rather rigid approach, in which the best evidence is generated and policy solutions require fidelity to the original model (Lomas and Brown, 2009: 906), complexity theory often suggests that top-down control can be an unrealistic and damaging aim. The task of policy implementation is more complicated and less hierarchical than the aim, in *implementation* (not improvement) *science*, to translate health evidence to practice (Nilsen et al, 2013). Further, policies implemented in the real world, to address complex problems, will inevitably produce unintended consequences, and will be subject to the effects of action elsewhere, with no way for the centre to control the process from beginning to end. In some cases, interventions will have no effect for long periods (years or even decades), followed by a major and unpredictable effect (Hobin et al, 2012: 110; Smith and Joyce, 2012: 72). In that

context, we do not know exactly how any policy measure will make a difference (Sanderson, 2009: 706). This insight tends to produce two recommendations:

1. Move away from the idea of major evidence-based policy changes towards the use of "'trial and error' policy making" and learning from pilot projects (Sanderson, 2009: 707).

2. Reject the use of 'blunt traditional hierarchical hard management methods' (Geyer and Rihani, 2010: 32-4), which will only produce the perception of failure, in favour of more flexible approaches which build error and adaptation into policy design (Little, 2012: 16; Geyer, 2012: 32).

Overall, this focus on complexity represents a rejection of the idea of a single policymaker at the centre of government, able to make important changes to the world with the aid of science and policy analysis. Instead, we have a range of policymakers in multiple venues seeking to adapt to, and influence, their policy environments using limited information (Cairney, 2014a: 11; albeit, often as part of a process driven and evaluated by central government - Cameron et al, 2011: 435-6).

**Conclusion**

Policy theories can help re-frame health policy analysis, to separate the 'pathologies' of policymaking systems from specific problems that can be addressed to reduce the evidence-policy gap. It is impossible to provide a blueprint for action, but we can draw attention to the limits to the 'barriers' literature when it focuses largely on improving the supply of information, the lack of opportunity to be influential, and the limited research skills of policymakers. This type of analysis can be supplemented by a focus, in policy theory, on: the need to present evidence-based messages which tell a story or frame the problem in the right way; the importance of long term strategies and relationships with policymakers and coalitions with like-minded groups; the time it takes for major policy change to occur, even when the evidence seems unequivocal; and, the need to engage at the 'street level' to ensure that evidence is incorporated within the everyday practices of professionals.

We can use these insights to generate four further tenets of evidence based policy making:

1. *Dissemination strategies should combine simple messages with persuasion*. The use of knowledge brokers or other services to translate complicated evidence into a simple action-based message is necessary but insufficient. Policymaking is about the use of evidence to help frame issues, combining information with an appeal to the emotional or other biased shortcuts that policymakers use when choosing which problems and solutions to pay attention to.

2. *Evidence-based strategies may only pay off in the long term*. Scientific advocates need to invest the time to develop trust within government, based on a reputation for providing reliable information and following the 'rules of the game' within policymaking circles (which may regard, for example, how people conduct themselves with policymakers). This degree of trust may be crucial when

policymakers seek information at short notice. It takes time to understand how policymakers think in particular departments, and which frames or arguments will be the most persuasive – particularly when the policy problem is complex and there is no clear solution. It also takes time to find the right allies, to form coalitions with like-minded actors willing to promote the implications of evidence within government.

3. *Effective strategies may focus more on 'where the action is'*. Most policy is processed by civil servants at a relatively low level of government, and delivered by professions and public bodies outside of central government. A strategy focused on elected policymakers at the centre may be doubly frustrating, when their attention seems to lurch unpredictably and they do not control the outcomes of their decisions. A more effective strategy may be to become part of the more routine process of central government, and to engage with local policymakers to inform practice.

4. *EBPM is a highly charged political process*. The case study of tobacco shows what it often takes to secure major evidence-based change: a campaign over several decades to persuade policymakers to treat tobacco as a major epidemic and to put in place the conditions to produce and implement a comprehensive response. Tobacco represents a model for other campaigns, but partly to generate a sense of realism when we seek evidence-based policy change.

5. *Engage with professionals who see the world through different eyes*. One way to understand improvement science is as an attempt to marry two very different philosophies about the nature of evidence: the EBM focus on a hierarchy of methods and gold standard; and, the focus in some professions on the evidence from everyday practice. It involves taking what people consider to be the best available evidence, and experimenting in local areas with ways to make sense of that evidence on the ground. The former approach may be based on the collection of quantitative evidence in controlled settings; the latter may be more qualitative, in complex settings.

## Chapter 4 Evidence in environmental policy: learning lessons from health?

Many scholars advocate the emulation of evidence based medicine (EBM) within environmental science. Further, at first glance, the 'barriers' literature on evidence and policy appears to be more advanced in health than environmental studies. The relevant literature on evidence and environmental policy appears to be far less developed – at least in terms of the number of comparable articles. Further, there is no direct equivalent to the ideal of EBM or its hierarchy of evidence and evidence gathering methods. However, it does not diminish a similar sense, within the scientific profession, that good environmental science should translate smoothly into good public policy.

Further, the environmental literature often seems more advanced in some areas, such as its recognition of the need to combine scientific, practitioner and 'community' knowledge to produce policy relevant advice. There are also major literatures – such as on the barriers to 'adaptation' - which do not use the language of 'evidence based policy making' but engage with policy-relevant themes, such as how to use evidence to foster paradigmatic policy change. In this more general sense, environmental studies may be engaging with EBPM issues without always using the same language.

Policy theory adds value to such discussions by improving our understanding of the role of evidence in environmental policymaking, and by drawing comparisons between the insights derived from health and environmental sciences. The latter seems particularly important since there is minimal cross-over in the literature and policy theory provides a well-established way to generalise from more than one policy field.

Therefore, this chapter engages in three main discussions. First, adopting the format of chapter 3, I critically analyse the literature which identifies the barriers to the adoption of evidence in environmental policy. This literature has two parts: (a) the smaller (33) collection of articles identified by Adam Wellstead when replicating the search of Oliver et al (2014a); and (b) the larger (approximately 60) collection of 'snowballed' articles described as relevant to EBPM in that literature, representing a mixture of older texts (outside of Wellstead's survey date, 2005-15), and articles which use terms such as 'knowledge' or 'science' rather than 'evidence'. I use 'see also' when referencing this literature alongside the original list, rather than provide a separate section, because the larger literature does not provide additional insights.

Second, I use contemporary debates on the 'barriers' to progress in climate change adaptation policy to identify a similar gap between environmental policy scholarship and policy theory. In particular, Eisenack et al (2014) call for better explanations of the 'obstacles that hinder the planning and implementation' of policies used to change public and organisational behaviour to adapt to the problem of climate change ('adaptation'). Biesbroek et al (2015) suggests that this call is based on a naïve view of the policy process and a belief that the identification and removal of 'barriers' is a straightforward process. Rather, we must better understand political systems and policymaking processes, to understand why the

identification of a major policy problem does not result inevitably in speedy and proportionate policy choices.

In each case, I identify the ways in which policy theories can provide a more sophisticated account of the gap between scientific evidence and (a) the identification of environmental problems, and (b) meaningful policy responses. As in chapter 3, I add case study discussions to give more depth to abstract discussions. I provide a comparison between tobacco control and climate change policies to demonstrate the issues that arise in 'global public policy', and to provide an alternative to a focus on 'barriers' to adaptation. Then, I examine the current debate on hydraulic fracturing ('fracking') which raises practical issues regarding the use of evidence in issues involving an unpredictable mix of high salience, scientific uncertainty, policy ambiguity, multi-level governance, and public protest. In such cases, it would be unrealistic to expect evidence or experts to settle the matter. Instead, fracking raises issues about the ways in which we might balance scientific evidence with policymakers' beliefs and public opinion.

In the conclusion, I return to the identification of 'key tenets' of EBPM, drawing together the discussion from health and environment studies to show the general applicability of policy theory to what often appear to be discipline-specific issues.

**The barriers to EBPM: insights from environmental studies**

When Adam Wellstead replicated Oliver et al's (2014a) search[v], for the literature on barriers to evidence in environmental policy, he identified 33 equivalent papers[vi]. My initial analysis of this list suggests that:

- Only 6 (18%) refer to policy theory or studies in a meaningful way. Most make no (16, 48%), minimal (5, 15%) or very limited (6, 18%) attempts to link their findings to theories of policymaking beyond environmental studies.

- Only 3 (9%) make meaningful reference to the general literature on EBPM, with one further publication making specific reference to studies of evidence and policy in environmental science. Further, 6 articles[vii] make no more than cursory reference to 'evidence-based' policy (they are empirical studies of problems such as pollution, not pollution policy) which reduces the total number of relevant articles to 27.

- The most common method (11, 33%) was qualitative, including interviews, focus groups and/ or documentary analysis – for example, to get a sense, from academics and policymakers, of the barriers to their relationship - followed by a mix of qualitative and quantitative (7, 21%), quantitative/ surveys (6, 18%), reviews of the literature or policy reports (5, 15%), and models or geological surveys (2, 6% each).

- Most articles were produced by specialists in environmental sciences (18, 54%), followed by members of interdisciplinary academic units (9, 27%), and papers with at least one scholar listed as a social scientist (6, 18%).

- The most studied area was Australia (7, 21%), followed by comparative studies of several developed countries (7, 21%), developed and developing (3, 9%), African states or drylands, the UK, Canada (all 3, 9%), Brazil, Ireland (both 2, 6%), Russia, Hungary (both 1, 3%) and one study (3%) of international policymaking.

- The most studied areas were land or catchment area management, such as African drylands or Australian coral reef (12, 36%), and climate change policies (7, 21%), followed by agriculture and energy (and 'other' – all 2, 6%) – while 8 (24%) focused more generally on environmental policymaking.

This initial set of articles is far smaller than the collection identified by Oliver et al (2014a) – which suggests that it is far less developed. This impression is reinforced by many articles which refer to EBM as something to aspire to in environmental science: as a way to synthesise the available evidence and package it in a way that is conducive to practical recommendations (Dicks et al, 2014: 119; Carneiro and da-Silva-Rosa, 2011: 3; Cvitanovic et al, 2013; Cvitanovic et al, 2014a; Webb et al, 2012: 203; see also Cook et al, 2013b; Fazey et al, 2004; Keen and Pullin, 2011; Pullin and Stewart, 2006; Pullin et al, 2004).

Environmental studies identify similar or comparable barriers to the use of evidence in policy. They are summed up by Stringer and Dougill (2013) in relation to land management: there is often a lack of policy relevance in academic research, and of academic knowledge about how to make use of their networks with policymakers; and, scientists do not appreciate the need to identify relevant policymakers and opportunities for timely engagement, to frame evidence in terms of policymaker aims rather than as a critique of existing policy, or to encourage practitioner participation in the research process (see also McNie, 2007; Burbidge et al, 2011; Lake et al, 2010).

As Table 4.1 suggests, the literature identifies such barriers in several specific environmental policy areas, or more generally in relation to academic-practitioner exchange. Most of the relevant studies identify the lack of good evidence on the size of the problem, or effectiveness of solutions, and the sense that scientists do not present that evidence in a timely manner and in a way that is likely to attract policymakers. Table 4.1 also provides examples of studies which highlight a lack of policymaker knowledge about, or attention to, scientific evidence, but partly to give the message to scientists that their data will not speak for itself.

**Table 4.1: Barriers/ solutions to the use of evidence in environmental policy**

| **Improve the supply of, and/or generate demand for, scientific evidence** |
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| *(a) the evidence on the problem is not good enough* |
| Until the 1990s, polices to influence climate change behaviour were hindered by the lack of evidence-based indicators of the effect of consumption on the environment. From the 1990s, scientists developed good monitoring tools, but few policymakers became aware of them (Barrett et al, 2005: 38). |
| Poor policy decisions are often underpinned by poor evidence on ecological history |

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| (Hamilton and Penny, 2015) |
| EU attempts to monitor and advise on the environmental impacts of agricultural practices are hampered by insufficient data (Louwagie et al, 2012: 149-50) |
| New models should be developed to address the paucity of data underpinning policy on climactic vulnerability and adaptation (Malcolm et al, 2014; see also Aoki-Suzuki et al, 2012) |
| The lack of local-area-specific knowledge undermines the effectiveness of otherwise evidence-based land management policies (Molnár, 2014). |
| Environmental scientists should follow evidence based medicine, to produce a database of systematic reviews and policy-relevant synopses (Dicks et al, 2014: 119; Carneiro and da-Silva-Rosa, 2011: 3; Cvitanovic et al, 2013; Cvitanovic et al, 2014a; Webb et al, 2012: 203). |
| *(b) the evidence on the solution is not good enough* |
| There is a lack of comprehensive databases of systematic reviews on biodiversity policy. Existing work is presented in a language that is too technical or politically naïve for busy public managers to take on board, and many studies do not provide a clear answer to pressing policy questions (Carneiro and Danton, 2011). |
| The scientific evidence base on climate change policy interventions is 'surprisingly weak for such a high profile area'. 'There is too little systematic climate policy evaluation work in the EU to support systematic evidence-based policy making' (Haug et al, 2010: 427). |
| Current performance management practices do not allow us to evaluate the effectiveness of conservation programmes; organisations only measure what is easy to measure (Rissman and Smail, 2015). |
| *(c) the evidence needs to be 'packaged' well (easy to understand, framed in a way that is attractive to policymakers, and/ or accompanied by realistic expectations for policy change)* |
| Academics should repackage their work according to the needs of their 'end user' – such as by providing pragmatic recommendations or information that helps them predict events and plan ahead' (Cvitanovic et al, 2013: 85; see also Boissière et al. 2013; Hamm et al. 2013; Longstaff and Yang 2008; Policansky, 1998; Weber and Word, 2001). |
| Policymakers will often not respond to an alleged policy problem if there is not an obvious solution (Lalor and Hickey, 2014: 10-12) |
| The rise of sophisticated policy assessment tools is caused more by technological advance than a demand for information in this form. Simple qualitative stories are used more frequently 'to present easily digestible analysis to the decision maker if one wanted the assessment to be instrumentally useful' (Nilsson et al, 2008: 348). |
| The carbon capture and storage (CCS) community has a coherent and uniform message for policymakers, which may help explain its major funding successes in the EU (Stephens et al, |

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| 2011: 388) |
| Government reports provide vast amounts of evidence but their links to effective policy are weak, partly because the reports come with unrealistic shopping lists for action (Wellstead and Stedman, 2014: 1000). |
| Scientists struggle to translate knowledge and concepts about risk to policymakers, stakeholders and the public (Yuen et al, 2013). |
| Policymakers often favour the natural, not social, sciences because the latter is characterized by greater debate over problems and evidence (Carneiro and da-Silva-Rosa (2011). |
| *(d) engage in networks and academic-practitioner workshops* |
| There is high participant demand to identify best practice in academic-practitioner exchange, and a belief that regular interaction helps build up trust (Hickey et al, 2013: 539; see also Cortner, 2000; Robertson and Hull, 2003, McNie, 2007). |
| To adapt to complex policymaking systems, scientists need to engage in collaborative/ participatory government rather than merely feed in evidence to the centre (Lalor and Hickey, 2014; see also Hessels & van Lente, 2008; Landry, Lamari, & Amara, 2003). |
| *(e) use intermediaries* |
| Scientists should use 'knowledge brokers' (Cvitanovic et al, 2014: 35-6; see also Cash and Moser, 2000; Canadian Health Services Research Foundation, 2004; Crona and Parker 2012; Gibbons et al, 2008; Meyer 2010; Michaels, 2009; Rametsteiner et al, 2011) |
| There is a need for 'hybrid people' but an absence of unanimous 'upper management' support (in public bodies in Canada and Australia) for knowledge brokers (Hickey et al, 2013: 534). |
| **Timing and opportunity** |
| Policymakers value timely and responsive research, but scientists face big time lags in publication (Cvitanovic et al, 2014a: 38) |
| 'Relationships of trust and establishment of expert credibility matter greatly in the acceptance of knowledge claims' (in international climate change treaty negotiations) (Rowe, 2013: 221) |
| Despite a new agenda on timely and policy-relevant research (on dryland policies in Africa) the evidence remains 'sparse' (Stringer and Dougill, 2013: 328). |
| Scientists should make themselves better aware of government priorities (Hickey et al, 2013: 529; see also Lawton, 2007; Klenk and Hickey, 2011). |
| **Encourage policymaker skills or better government understanding of problems** |
| Governments tend to deal with environmental crises rather than plan for the long term. A lack of government commitment to collecting policy-relevant data produces often undetected |

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| policy failures (Clare and Creed, 2014: 243) |
| Policymakers rely on personal experience and expert advice, not systematic searches of the literature (Carneiro and da-Silva-Rosa, 2011: 1; Cvitanovic, 2013: 85; see also Cook et al, 2010; Cvitanovic et al, 2014b; Fazey et al, 2004; Pulin et al, 2004) |
| Many policy managers do not prioritise scientific evidence and are unaware of advances in adaptation science. Policymakers often have poor knowledge of environmental risks, and their priorities often do not reflect the best evidence (Cvitanovic et al, 2014a: 38) |
| Ministers do not understand the data from the sophisticated policy assessment tools that they, 'have been so keen to advocate and nurture' (Nilsson et al, 2008: 350). Rickards et al (2014: 654) provide similar conclusions on scenario planning. As in the nomenclature on evidence-*informed* policy, they identify 'scenario methods' or 'scenario thinking' |
| Policymakers often do not know about, or have the resources to find or understand, up-to-date scientific information (Cvitanovic, 2013: 85; see also Grorud-Colvert et al, 2010). |
| Policymakers (and the public) are biased and it is difficult to persuade them to change their beliefs, particularly in salient issues (Cvitanovic et al 2014; see also Kahan et al, 2012; Leviston and Walker, 2012) |
| UK government ministers appear unwilling or unable to engage in the systematic review of the evidence on business regulation (Taylor et al, 2013). |

*Differences in academic-practitioner cultures*

Further, several articles identify the same general sense, found in health - and studies of the 'science/ policy interface' (Gaudreau and Saner, 2014) and 'barriers to knowledge exchange' (Cvitanovic et al, 2015) - that there are differences in academic and political 'cultures':

- *Language barriers, timescales, incentives*. Scientists speak in a technical language not accessible to policymakers, particularly when they write for specialist journals. Scientists examine issues over the long term, and often publish research years after they produce their findings, while policymakers have a limited time in which to gather information before making decisions. The incentive for scientists to seek funding for new research, and publish in high status journals with a long time lag, is greater than to communicate with policymakers and produce quick and accessible reports (Hickey et al, 2013).

- *Perceptions of scientific knowledge*. Policymakers do not necessarily see scientific knowledge as less biased than other forms of information, and often recognise 'the importance of other forms of knowledge, such as community and cultural knowledge' (Cvitanovic et al, 2014: 35-6; Cook et al, 2013a: 755; see also Steel et al, 2004; see Oreskes and Conway, 2010 and Michaels, 2008 on the ways in which actors try to

undermine scientific knowledge). Policymakers do not share scientists' adherence to journal impact and funding as key metrics, so both should produce new metrics on policy impact (Cvitanovic et al, 2014: 38).

- *Policymakers are looking for certainty and clear solutions*. For a major change in policy, ministers want 'proof' but scientists offer the 'balance of probabilities' (Lalor and Hickey, 2014: 10-12). The 'contested and uncertain' nature of much information makes it unsuitable for policymakers (Stringer and Dougill, 2013: 328). They often reject or seek to discredit the results of sophisticated decision-making 'tools' if they provide partial answers open to interpretation and debate (Barrett et al, 2005).

- *Scientists focus on 'the evidence', policymakers try to reconcile beliefs*. Policymakers, 'expect evidence-based analysis' but 'have to make judgements that balance different opinions, as well as claims and counterclaims from interest groups, including scientists' (Hickey et al, 2013: 529; see also Cortner, 2000; Oreskes 2004; Robertson and Hull, 2003; Sarewitz, 2004; Sarewitz and Pielke, 2007; Schenkel, 2010; ).

Generally, such articles highlight the tendency of academics to miss the chance to influence policymakers with their findings, and for policymakers to rely on personal experience or ad hoc links with experts rather than the state-of-the-art in scientific research (Dicks et al, 2014: 119). They often recommend academic-practitioner networks to foster systematic links between the professions, and workshops to generate a common language or shared set of policy aims, but tend to identify the barriers to communication rather than the effectiveness of solutions (Cvitanovic, 2013: 89-90; see also Briggs, 2006; Roux et al, 2006; Likens, 2010; Owens, 2005; Rayner, 2006; Janse and Konijnendijk, 2007).

*The politics of policymaking and importance of beliefs*

Some studies recognise aspects of the politics of policymaking. For example, international treaty negotiations on climate change highlight a developing norm among experts, to use a very technical/ closed language to negotiate the detail, but with the knowledge that major (non-evidence-based) compromises have to be made during political negotiations (Rowe, 2013; see also Sharman and Holmes, 2010; Hoppe, 2005). Or, when domestic aspects of environmental science are highly controversial, and debates are driven as much by emotion as evidence, people may already have their own fixed views and policymakers may be prone to 'misinterpreting or even refuting the information being presented, thus preventing the integration of the information into the decision-making process' (Cvitanovic et al, 2014: 33).

In such cases, Lalor and Hickey (2014: 10-12, drawing on Cash et al 2003) suggest that scientists need to go beyond 'credible' knowledge built on method and peer review, towards 'legitimate' knowledge built on public/ community awareness or support, and 'salient' knowledge, accessible and provided in a timely manner to make it more easily 'sold' within government (2014: 7). Yet, even the staffs of government agencies lack such political and organisational skills and the ability to speak the same language as politicians (2014: 10-12).

*Wicked problems in environmental policy and policymaking*

Some of these discussions connect to the idea of 'wicked' versus 'tame' problems (Rittel and Webber, 1973: 155). 'Tame' problems are conducive to a 'linear' form of policymaking in which policymakers identify problems and scientists provide the evidence to solve them: we have a specific and well-understood problem, and an objective account of the public good or a clear sense of equity generated by a consensual political exercise; therefore, it makes sense to identify an 'optimal' solution to the problem generated by scientific evidence.

With 'wicked' problems, these conditions are not met: there is uncertainty and debate about the nature of the policy problem, any solution will produce winners and losers and there is no agreement on an equitable solution, so it makes no sense to talk of an 'optimal' solution. Further, the process of debating problems and solutions often seems chaotic: policymakers stop working on the issue when they run out of attention or money or find a 'good enough' answer (not when the problem is solved); the issue is difficult to contain within one unit or department of government; and, it is difficult or impossible to know if a solution reduced the size of the problem and therefore to learn from previous policies (1973: 161-4). Consequently, for example, the political commitment to address environmental policy rises and falls in disproportion to the size of the problem, such as when solutions are hard to sell because they require behavioural change in the population, or when policymakers face major problems of multi-organisational collaboration (Barrett et al, 2005: 308).

Stringer and Dougill (2013: 328) use this broader context to help explain the lack of policy relevance in academic research, and lack of academic knowledge about how to make use of their networks with policymakers. Academic research requires considerable translation and, even then, it is 'often contested and uncertain' – which makes it unsuitable for policymakers. Despite a new agenda on policy-relevant research, it remains 'sparse'. This reflects, partly, the 'wickedness' of the policy problem, involving 'rapidly changing social, economic and political contexts' which requires the study of multiple policy areas and inclusion of a huge number of disciplines – a task which few scientists complete well (2013: 328-9).

This lack of cooperation within academia and with policymakers is exposed when scientific evidence informs only some aspects of complex problems. For example, when policymakers seek to translate major evidence-informed international efforts on sustainable land management (such as the United Nations Convention to Combat Desertification, UNCCD), they find that broad policies do not provide a guide for national and local action, since they are not well informed by regional-specific evidence (2013: 329). In that context, Stringer and Dougill identify, in several African states, the value of forums which allow the participation of land management practitioners, policymakers, and scientists. However, they also note their limited effectiveness, following a lack of formal government support/ resources for knowledge exchange, and the continuous loss of 'institutional memory' when civil servants and 'knowledge brokers' move on to other policy issues. This is a common approach in the literature: to identify problems in current approaches, but find little evidence of success in experiments to solve them.

**The state of the art in studies of evidence and environmental policy**

Most studies do not refer to policy theory or any equivalent body of work to show how their studies fit into the bigger picture. Instead, they produce a small number of individual case studies of policymaking interventions which are difficult to compare to others. The authors recognise the obstacles to translating and promoting scientific knowledge, and that they must operate in a political process, but few recognise that these issues have been relatively well documented in policy studies, and discussed in very similar (often atheoretical) ways in other fields such as health policy. The small number of exceptions focus on two key areas:

1. the implications of complex policymaking for the production and use of evidence
2. the potential for 'participatory' policymaking to legitimise scientific evidence in the eyes of policymakers.

*The implications of policymaking complexity: 1. Problem framing and solution evaluation*

When Haug et al (2010: 427) argue that the scientific evidence base on climate change policy interventions is 'surprisingly weak for such a high profile area', in part they are identifying the negative effects of a limited focus on key policy concepts and processes. There is insufficient awareness in the climate change literature on questions that would be asked routinely in political science: what is the dominant 'framing' of climate change problems; who are the most significant winners and losers with regard to the outcomes of policies; and, what is the effectiveness of multi-level governing arrangements (2010: 432-6)? This gap contributes, to some extent, to the problem of policy evaluation, when policymakers and stakeholders are unclear about the central aims of policy and, therefore, the most appropriate way in which to measure its effects. More generally, there is a lack of quantitative assessment of the effectiveness of policy instruments even in simple terms such as 'tonnes per policy' – which is caused partly by unclear policy benchmarks ('no baseline scenario for emission was established before a policy was initiated') and an inability of evaluations to separate the effects of policy from the changes of public behaviour that would happen anyway, or other causes of change ('noise') (2010: 440-1).

*2. The role of bounded rationality and importance of beliefs*

Nilsson et al (2008: 335) argue that many governments (they study Germany, Sweden, UK, and the European Commission) have expressed strong support for the development of policy assessment tools - from simple tools like decision trees to cost-benefit-analysis and sophisticated computer models - but that they use them rarely to aid policymaking. There is more use of cost benefit analysis than sophisticated models, but to help inform wider political debate rather than settle the matter. Further, the use of simple tools, such as decision trees, is pervasive but does not reduce the use of assertion in decision-making (2008: 345-7). Advanced tools were used most in Sweden - particularly for the more 'rational' commissions of inquiry used to (a) initiate major policy change, as part of a years-long process of policy formulation, or (b) bury difficult issues for a few years (2008: 351) - and least in the UK,

which displays, 'a striking discrepancy between the political desire for more evidence-based policy and the lack of formal analysis' (2008: 347).

Nilsson et al tie this finding to several policy concepts, including multiple streams analysis. First, computer modelling has developed because it is low cost and the technology is developing – not because policymakers demand model-based policymaking. It is described by Radaelli (2004: 734) as a 'solution in search of a problem'. Second, many models are designed incorrectly, to solve problems using a 'rational-instrumental' approach in which decision-making is linear: a single policymaker or core group of policymakers identify a problem, the model provides the data and possible solutions, and the policymaker selects the best option (Nilsson et al, 2008: 343). Instead, many actors compete to define problems, the production of what we call 'knowledge' is a highly contested process, solutions are often produced to further the pet projects of participants, and the timing of, and motivation for, the adoption of policy solutions is often unpredictable (2008: 344).

Third, there is a lower tendency to use formal modelling in salient areas where many beliefs are already entrenched, and when policymakers do not like the unpredictability of the results of modelling. Fourth, even sophisticated models tend to be confined to individual subsystems or government departments; issues may be cross-cutting but the analysis reinforces silo thinking (2008: 350). Finally, boundedly rational policymakers are often sceptical about, or unreceptive to, the results of advanced modelling, particularly if they don't understand the process and can't work out easily how the results were produced. The dominant mode of presentation is simple qualitative description, 'driven by the need to present easily digestible analysis to the decision maker if one wanted the assessment to be instrumentally useful … this desire for simplicity among politicians diminishes the attractiveness of the very assessment tools that politicians have been so keen to advocate and nurture' (2008: 348-50; see also Cerveny et al, 2011).

*3. The need for scientists to adapt to complex or multi-level policymaking*

Wellstead and Stedman (2014: 1000) argue that government reports generate a huge amount of information, and produce unrealistically long shopping lists for policy action at the central level, without enough thought to what happens next. This is despite the evidence from policy studies that systems are complex, power is diffused across levels, and governments form networks to achieve a degree of consensus on action. EBPM is one part evidence gathering and one part politics, in which governments design processes to include other actors in gathering and using policy advice. So, the reports need to recognise, for example, how local level policymakers will respond to evidence based policy advice, either by embracing this new agenda or ignoring it when they engage in day to day 'firefighting', with limited ability for longer term planning. Their survey identifies a spread of people, seeking evidence to inform policy, across several levels of Canadian government. Most are time-stretched and lack the capacity to gather and consider evidence effectively.

The solution for scientists is not to provide more information, but to consider how policymakers use often-contested evidence to produce compromise policy solutions, and so to

tailor their evidence to be conducive to the types of often-immediate (and locally specific) political problems that local policymakers try to solve. This analysis takes us some distance from the idea that EBPM is, can, or should be a centralised process to produce policy that is merely implemented by other bodies.

Rissman and Smail (2015: 925) provide a comparable argument, about the limits to 'adaptive performance management' when multi-level governance increases policymaking complexity and undermines the evaluation of policy solutions. They find that there is a very limited link between environmental initiatives and evidence of their effectiveness, because few organisations report in adequate depth to identify a causal link. Performance measurement is becoming routine in US government, but central systems allow local actors to provide the wrong information or measure the wrong thing (2015: 924).

*4. The potential implications of complexity for policy learning*

Huntjens et al (2011) draw on the policy learning literature to highlight often-limited evaluation processes in river basin management. They identify a high political commitment to water management (to address climate change), but low ability to assess the effectiveness of interventions. They pursue the idea of complexity, to argue for a form of learning that adapts to constant change and the need to reappraise policy decisions regularly. They examine the kind of learning (single, double or triple 'loop') that takes place, from the use of technical information to aid routine decision-making, to information that changes how policymakers think about the problem. They find key tensions between policymaking aims: bottom up policymaking is necessary to develop adaptive learning, in which actors use new information to redevelop goals, while top-down policymaking allows authoritative actors to manage conflicts in evidence gathering and goal formation, and juggle the multiple priorities that are not always pursued on the ground.

In effect, Huntjens et al (2011: 160) make the case for decentralised policymaking to maximise the role of evidence in policy. In highly centralised and top-down systems, governments do not 'learn' enough from the evidence; they modify their strategies at the margins when the evidence suggests the need for a major change in approach or a need to challenge their initial assumptions about the nature of the policy problem. In contrast, in decentralised systems, local actors, closer to the day-to-day evidence gathering process, have the power to adapt quickly and in a major way when new evidence highlights new problems. Overall, it is a challenge to the assumption, discussed in chapter 2, that only a centralised process allows the evidence to be managed and used effectively.

Lalor and Hickey (2014) make a similar argument in relation to decentralised and network based modes of governing, suggesting that more should be done to decentralise and encourage 'pluralistic, integrative, collaborative approaches to governance that better span organizational and spatial boundaries' (2014: 2). They suggest that this would have huge implications for the role of science, with scientists required to be more adaptive to policymaking dynamics, more willing to engage with other actors (including other academic

disciplines) and pragmatic in their calls for the use of evidence (see also Pohl, 2008; Fox et al, 2006).

*Participatory policymaking: 1. The stated benefits*

These arguments, about the need for scientists to recognise policymaking complexity, and to present evidence in local or decentralized policy venues, are prominent in the environmental policy literature. Many recognise that central policymakers or local policy managers do not necessarily privilege scientific knowledge, and even fewer recognise the hierarchies or gold standards (in relation to RCTs and systematic review) that some scientists would take for granted. Some highlight the need to incorporate 'community and cultural knowledge' (Cvitanovic et al, 2014a: 38), for the sake of pragmatism or to produce more policy relevant knowledge.

For example, D'Aquino and Bah (2014: 207) highlight a general lack of policymaker and scientist appreciation of policymaking complexity and policy uncertainty, and the need for flexible governance arrangements when managing and conserving African drylands. Drawing on 11 similar studies, they describe the use of a 'participatory modelling method' - role playing games and agent based modelling (ABM) - to help people design the rules governing land use, show them the effects, and help them think about how to respond. D'Aquino and Bah (2014: 207) argue that the method helps clarify several meanings of the term 'indigenous knowledge', 'ranging from knowledge based on practical experience being included in the scholar's framing of knowledge, to a legitimate local ability to contextualize and re-arrange scientific expertise, to profoundly different worldviews which do not match ours'.

Rickards et al (2014: 641) discuss the extent to which participatory scenario-based planning is replacing traditional evidence-based policies based on scientifically-driven prediction. Environmental complexity makes it difficult to inform policy through prediction, and scenario planning/ modelling may increase participation in policy design and stakeholder ownership of the results. Drawing on the analysis of 11 articles, they describe a potential paradigm shift in futures studies, or at least a tension between 'positivist' prediction and 'constructivist' searches for meaning, with 'scenario planning' as a compromise, able to recognise social context and the practical limits to 'adaptation' (see below). Scenario planning exercises include users and stakeholders in decision-making, in part to accentuate the complexity of policymaking when many actors interact. On that basis, just as we need to move from a linear model of environmental change, so too do we need to reject a linear model of EBPM and a false sense of policymaker control (2014: 655, drawing on O'Neill et al, 2013).

In other areas, studies assert that some form of 'participatory' policymaking, or the 'co-production' of knowledge or policy, addresses key problems in EBPM, including the need to: boost a sense of legitimacy for scientific knowledge, through 'engaged communities', when issues such as wind farms involve dispute and can't be settled with reference to evidence (Howard, 2015); provide a forum for 'stakeholders' and 'experts' to consider the 'socio-political dimension' as well as the 'knowledge or substance dimension' when designing

sustainability indicators for agriculture (Louwagie et al, 2012: 149-50); and, use 'the knowledge of local people' to better inform evaluations of local area specific means of conservation management (Molnár, 2014: 116; see also Backstrand, 2013; Ceccarelli et al. 2011; Conrad et al, 2011; Hoey et al. 2011; Robertson and Hull, 2003; Underwood et al. 2013).

*Participatory policymaking: 2. The limitations*

The general absence of theoretically informed analysis of policy undermines the value of such approaches. For example, Cook et al (2013a) note that the broad notion of participation has become a 'panacea' for policy in areas such as 'catchment management' (2013a: 756). They identify a 'participatory' turn in environmental policy studies, drawing on seven studies in catchment management, alongside a much larger literature which criticises hierarchical and 'expert-led' governance, and calls for 'citizen participation' to 'occur at every stage of governance, from problem identification to resolution and review' (2013a: 756)

Cook et al (2013a) identify a tendency in environmental policy articles to promote participative democracy naively without providing much evidence of its effectiveness or an accurate picture of what it entails, such as: an asymmetry of power between participants, particularly when the focus is on knowledge; and, the vague use of terms such as 'co-production' to describe a range of activities, not all of which encourage a variety of equal voices. In fact, 'participatory politics' is often just routine consultation by the government (2013a: 763) and there is not an inevitable link between the production of knowledge and policy. Although Cook et al (2013a: 755) advocate greater policy deliberation, they highlight the tensions between it and other aims:

'(1) representative democracy, which admits, yet captures, the public's voice; (2) professionalisation, which can exclude framings that facilitate more symmetric engagement; (3) statutory requirements, which hybridise participatory catchment organisations to deliver government agendas and (4) evidence-based decision-making, which tends to maintain knowledge hierarchies'.

So, they identify some ways to make participation 'symmetric' (i.e. to remove hierarchies based on knowledge and status) and include minority views, but these actions feed into larger processes in which majority views come back to the fore. Further, many participatory discussions are facilitated by NGOs which often rely on government funding: a process to challenge hierarchy is undermined by funding and reporting arrangements (2013a: 771). Policymakers also value the role of scientific knowledge to give a sense of objectivity to their decisions – something that participatory processes do not provide (2013a: 772); nor do they provide a common language that combines scientific knowledge with local or community knowledge (2013a: 773; see also Van Nijnatten, 1999).

Such problems, combining naïve hopes for participation with asymmetries of power in policymaking, underpin a tendency for studies to experiment with participatory processes but struggle to measure, or find evidence of, their effectiveness. For example, Yuen et al (2013: 567-8) argue that risk assessments of climate change have risen dramatically, to help

policymakers, stakeholders and the public think about how to adapt and modify their behaviour, but that such technical exercises cannot be divorced from the political process. Instead, they provide platforms 'to question initial assumptions, explore multiple framings of an issue, generate new information, and galvanise support for collective actions'. They describe a series of steps towards 'adaptation' to the risks - which is almost identical to the 'policy cycle' - describing it as an 'idealised framework' that is interpreted and used very differently in different 'contexts' (2013: 568-9). They then identify the weak link between the evidence (as represented in outcomes of deliberations) and the political response, and compare this process to well-established arguments that the evidence does not 'close down policy debates' (2013: 569). Instead, in areas where there are many views, and uncertainty is high, these processes *might* promote 'social learning'.

In their case studies, scientists accepted that expert knowledge was insufficient to mobilise stakeholders and the public; that local/ practitioner knowledge ('citizen science') provided complementary perspectives; or that participatory politics brought in other sources of information and beliefs. However, the authors also found that participatory processes often produced minimal information and were no better at resolving disputes - particularly when key policymakers were not involved – and that the new forum was just as bad at assessing environmental risk.

**The bigger picture: from barriers to evidence in policy to barriers to policy change**

Without a full appreciation of policy theory, most discussions of the relationship between environmental evidence and policy are flawed. Crucially, they highlight barriers to the use of scientific evidence that, if overcome, would not solve the problem of environmental policymaking. It is important to gather and package better evidence in a timely manner to scientifically literate policymakers, but this would not guarantee its use in government. Rather, the use of evidence goes hand in hand with major long term strategies to form alliances, engage in 'battles of ideas', and persuade governments to rethink the ways in which they understand policy problems. This may be a multi-level strategy, to recognise that policymaking is spread across political systems and that scientific advocates need to persuade more than one collection of policymakers, and a fluid strategy, to reflect continuous changes in policy, policymaking, and policy outcomes.

*Barriers to climate change adaption*

This absence of policy theory extends to the broader literature which seeks to understand how to overcome 'barriers' to policy change. For example, in climate change, barriers may refer to slow progress associated with the United Nations Framework Convention on Climate Change (UNFCCC) which 'identifies two options': 'mitigation of climate change by reducing greenhouse gas emissions and enhancing sinks, and adaptation to the impacts of climate change' (Klein et al, 2005: 580). These tasks can be complementary but remain distinct (2005: 580). Policies for mitigation, such as to reduce greenhouse gas emissions, will have an effect on the magnitude of future climate change, and some policy initiatives will impact positively on mitigation and adaptation. However, the ways in which political systems adapt

will be managed by different actors: mitigation largely involves energy and forestry; adaptation includes 'agriculture, tourism and recreation, human health, water supply, coastal management, urban planning and nature conservation', and each aspect may exhibit different policy dynamics (2005: 581). In addition, the benefits of mitigation are global (albeit spread unequally) and relatively easy to quantify, but adaptation efforts are relatively local and difficult to quantify with a well-recognised metric (2005: 581).

As Klein et al argue (2005: 580), the topic of adaptation extends natural scientific analysis to human behaviour, which has not traditionally been a focus of climate change scientists. The subject involves a steep learning curve that could be made more manageable with reference to disciplines with more knowledge of collective action. Yet, recent debates suggest that this knowledge of policy processes is very low among adaptation scholars. The evidence-policy literature suggests that scientists only partially identify the key barriers to the incorporation of evidence into *policy*, while the adaptation literature highlights only some important aspects of *policymaking*. In both cases, a focus on barriers only takes us do far.

In their relatively positive review of the adaptation literature, Eisenack et al (2014: 867) identify a major 'deficit' – akin to an 'implementation gap' - between the need to adapt to climate change, accepted by governments, and the current levels of adaptation. They review a patchy literature of *case studies*, which identify 'barriers' or 'constraints' to adaptation and propose a range of causes, and *other reviews*, which try to categories these barriers. Although the categorisations are broad and applicable to any policy area, some argue that particular aspects are specific to, or highly pronounced in, adaptation: the short-termism of politicians (combined with the demands of an electorate often not committed to adaptation) is not conducive to a long term adaptation vision; there is unusually high uncertainty about the level of environmental risk and likely effectiveness of interventions; and, adaptation is particularly vulnerable to a lack of joined up action across government, and in partnership with non-governmental actors (2014: 868).

Eisenack et al (2014: 868) find that few case studies explain barriers well, and that meta-analyses offer *descriptions* of barriers but 'do not yet offer systematic explanations' (see also Keskitalo, 2012: 1). Further, the discussion of potential solutions – such as 'mainstreaming' climate change predictions into policy planning in other fields, establishing knowledge-sharing, and improving cross-organisational cooperation – tends to be vague, while stories of success tend to identify the role of exceptional individuals, and there is contradictory evidence about the effect of national commitment (it can inspire or stymie local action) and individual leadership (it can inspire or undermine collective policy ownership) (2014: 869).

Biesbroek et al (2015) provide a relatively negative critique of this literature, identifying a similar lack of conceptual progress, and criticizing a tendency of many studies to fill gaps in their own knowledge of policymaking by using unhelpful descriptions of barriers. In particular, many studies make reference to low 'political will', partly to reflect their authors' normative stance on adaptation policies, their assumption that the policy process can be treated as top-down and linear, and their belief that politicians are getting in the way of progress (2015: 494; compare with the reply by Eisenack et al, 2015). Wellstead et al (2015)

relate this approach to a 'black box' or 'functional' understanding of policymaking in which scientists expect the policy process to produce what is required of it, and therefore present unrealistic recommendations to policymakers and fail to engage with other key actors. These problems arose in political science *50 years ago* when scholars portrayed political systems largely as arenas through which environmental factors and actor demands would translate into policy outcomes, without explaining *how* those processes work (2015: 404). Since then, these models have been replaced by theories which better answer the key questions raised in Eisenack et al's (2014) review, including: how do policymakers decide between conflicting goals, and to what extent do external events prompt rapid policy action?

*Insights from policy theory: go beyond these dual barriers*

What is lacking from the adaptation literature is reference to the policy concepts which help us go beyond a global implementation gap, and the identification of barriers, towards a greater understanding of domestic or multi-level policy processes. The common experience of UN global tobacco and climate change framework conventions is that actors make commitments in a global policy environment that is relatively conducive to policy change. International cooperation and agreements form a meaningful part of domestic policy processes but, while a global response seems relatively coherent, domestic implementation is uneven. In both cases, a focus on policy theories and concepts allows us to understand these processes. To understand how domestic environments work, we need to focus on the role of:

1. The actors involved, in making, influencing and delivering policy, at several levels of government. This analysis reminds us that political systems are generally not centralised to the extent that we can pursue one evidence-based policy at one point in time.

2. Institutions, or the norms and rules followed when delivering policy. In particular, it matters which government departments take the lead, since this indicates which rules they use to prioritise and understand issues.

3. Policy networks, or the regular interaction between those who make and seek to influence policy. One of those key institutional rules regards which groups have the most influence and are most consulted by governments.

4. Context, or the socio-economic, demographic and geographic factors that policymakers take into account when making decisions, and the routine (such as elections) and non-routine events with the potential to shift attention or provide an impetus to policy change.

5. Ideas, as the interplay between scientific and other forms of knowledge underpinning action, the often deeply held beliefs of actors, and the ability of actors to persuade others to act in a particular way, partly by competing to 'frame' issues to raise attention or influence the ways in which people primarily understand a problem and seek to solve it.

Using these concepts, our interest is in the extent to which domestic policy environments can change to become more conducive to adaptation (Mamudu et al, 2015; Cairney and Mamudu, 2014; Studlar and Cairney, 2014; Cairney et al, 2012). In the idea-type scenario: the government accepts the scientific evidence, underpinning mitigation and adaptation, wholeheartedly; a powerful department dedicated to climate change adaptation takes the lead within government; its operating procedures favour the prioritisation of climate change as a policy issue, and the framing of related issues (such as energy and land use) through that lens; it prioritises consultation with groups committed to adaptation; and, the socioeconomic context is conducive to control (for example, efforts at mitigation and adaptation do not harm economic development or reduce the standard of living of the population). However, even then, there remain unresolved issues about cooperation across multiple levels of government, and between governments and the actors delivering, or regulated by, policy (Keskitalo et al, 2012).

By making reference to these factors, environmental scholars have the ability to encourage generalisation from multiple individual or comparative case studies. They can then supplement broad explanation with reference to more specific theories to examine key aspects of the policy process.

For example, Keskitalo et al (2012) use multiple streams analysis (MSA) to explain the variable extent to which climate change related events prompt major policy change (see also Brunner, 2008 on emissions trading). Further, Pralle (2009) uses a similar focus on MSA and agenda setting to make practical recommendations for climate change scientists. Only some recommendations mirror the calls within the scientific literature on evidence and policy to, for example, 'Regularly report key problem indicators in user-friendly terms' and 'Emphasise scientific consensus and knowledge' (2009: 789-90). Others are based on the need to engage within the policy process in a more meaningful way: frame issues to catch and sustain attention, by emphasising simple stories based on 'local impacts and personal experience'; persuade people that serious action is in their interests (focusing on human health); engage in moral as well as empirical arguments; frame solutions in terms of their positive track record, and their links to energy security and economic gains (if people care more about current than future losses); *exploit* climate change related crises or events, to raise attention to the problem, and provide a well-worked out solution in advance; and, 'venue shop' to seek a sympathetic audience to policy change (2009: 791-6).

This advice goes far beyond the need to make scientific evidence more easily understood or accessed within government, and beyond a focus on generic 'barriers' such as political will, which put the blame on policymakers rather than an onus on scientific advocates to act more effectively in cooperation with sympathetic actors. It is also based on the science of evidence based policymaking; on a huge number of studies that help us understand policymaking and give us clues about how to engage to maximise the use of scientific knowledge on policy problems and solutions (see also Litfin, 2000 on the ACF, and Kern and Bunkeley, 2009 on multi-level cooperation).

Such scholarship should also draw on Ostrom's work on institutions and collective action, because climate change policy requires major concerted action, between states at the global level, government departments at the national level, and government and non-government actors at multiple levels (see also Poteete and Ostrom, 2008 and Poteete et al, 2010 on how to provide systematic reviews of case studies in natural resource management). Ostrom (2010: 551; 2012) provides an alternative solution to global top-down solutions and the sense that collective action problems, in which there are limited incentives to cooperate voluntarily, should be solved primarily via an appeal to authority and 'externally imposed regulations at the global scale'. She identifies an impressive amount of *theoretically informed* empirical evidence of collective action, in relation to mitigation policies (largely to reduce greenhouse gas emissions), by a large number of actors, in the absence of an effective single national or global authority. As such, Ostrom (2010: 554-5) presents a clearer picture of policy developments and more coherent account of policy failures and successes than any equivalent review of the atheoretical case studies on barriers to adaptation.

**Barriers to the use of evidence in policy revisited: the case of hydraulic fracturing**

Hydraulic fracturing for shale oil and gas ('fracking') provides an important case which helps us challenge further the idea that there can be an unproblematic adoption of 'the evidence' into policy, or even a reliance on 'the experts' to recommend the best evidence-based solution. Indeed, Weible et al (2016) identify major international variations in policy, based largely on the same scientific information on climate change, and similar information on safety (Jasanoff, 2005 identifies similar variations regarding comparative policies on genetically modified foods, embryology, abortion and stem cell research).

First, fracking comes with an unusually high degree of uncertainty, in relation to the *risks*, such as the effects of fracking on local environments and populations, the *rewards*, such as the economic viability of commercial fracking and its role in boosting the energy independence of countries (a key issue in the US – Heikkila and Weible, 2016), and likely *future behaviour*, when actors respond to new information on safety, or the availability of shale gas affects the price of other sources of energy such as coal (a key issue in Germany, with diminishing reliance on nuclear energy – Tosun and Lang, 2016). Consequently, scientific evidence will not settle the matter. Instead, there is an onus on elected policymakers to choose between options with unclear consequences, particularly since each choice will produce winners and losers. So, for example, in the UK, scientific reports have identified the safety of well-regulated fracking operations but refused to advocate its use (Cairney et al, 2016).

Second, fracking policy involves ambiguity. Much depends on how it is framed primarily: as an extension of climate change mitigation policy, focusing our attention on the need to minimise the contribution of fossil fuels to energy consumption; as a local environmental issue specific to the region affected directly by fracking; or, as a boost to energy security and economic growth. In turn, the dominant framing influences which evidence is in demand by policymakers: the first frame privileges climate change, the second public health scientists, and the latter third calls for information from geologists and engineers about the safety of

individual projects, and from geologists, economists and the industry about the commercial viability of each drill site. The same process may be apparent when policymakers seek evidence from public opinion, have to judge contradictory views on climate change and energy use, and weigh up the relatively abstract issue of climate change with the immediate local and national impacts of fracking. In other words, the articulation of the research question - 'is it safe?', 'is it economically viable?', 'is it unpopular?' – largely determines the demand for evidence.

Third, many political systems maintain multi-level policymaking arrangements, in which there is more than one source of demand for scientific evidence. For example, the UK Government takes responsibility for energy security, licensing and taxation, but shares responsibility for environmental regulation with the EU, and devolves the power to grant planning permission to the devolved governments in Scotland, Wales and Northern Ireland, and to local authorities in England (Cairney et al, 2016). Each type of government may face different incentives and weigh up evidence in different ways (for example, the UK Government is highly supportive of early efforts to identify the commercial potential of shale gas, while the Scottish Government has introduced a moratorium). Consequently, scientific advocates need to know about the division of policymaking responsibilities, how policymakers at each level understand the policy problem, what level of interest group and community engagement is associated with each level, and, therefore, how to form coalitions and work with others to maximise the use of scientific evidence in each case.

**Conclusion**

The literature on the barriers to the use of scientific evidence in policy is not as extensive in environment science as in health policy studies, but it makes similar points about EBPM:

- Current evidence on the nature of environmental problems, or the effectiveness of policy solutions, is often patchy.
- The evidence is not 'packaged' well. It needs to be easier to understand, 'framed' in a way that is attractive to policymakers, and/ or accompanied by realistic expectations for policy change.
- Scientists do not engage well with policymakers, either in networks, academic-practitioner forums, or by using 'knowledge brokers'.
- Broad differences in academic-policymaking cultures undermine the ability of scientists to engage in politics in a timely manner, or in a way that will maximise the impact of their findings

This kind of analysis tells us something about the 'science-policy interface'. Yet, it tends not to be well informed by policy theory. This matters because one might look at the list of barriers and conclude that, if we can overcome them, we can change significantly the use of evidence in policy. That would be a mistake, since there is a big difference between the use of scientific evidence to make policymakers aware of a problem, prompt them to act, act in an

appropriate and proportionate way, and/ or provide effective solutions. Further, we need to understand *why* scientists need to adapt to the vagaries of policymaking, or a tendency for policymakers to: address short term issues rather than plan for the long term; rely on personal experience and limited expert advice; misjudge the risks associated with environmental problems; seek simple, easy to understand, stories rather than the results from sophisticated models; and, use science selectively, often to give a gloss of objectivity to their policy choices. In other words, *we need more scientific evidence on the policy process*.

Most of the environmental literature fails to appreciate the science of policymaking, with two main consequences. First, its lack of knowledge produces a tendency for authors to recommend the same things each time to overcome the barriers between evidence and policy – such as more academic-practitioner workshops to identify barriers, or some form of participatory policymaking – without generating a sense of progress. Such studies should also consider, for example, the huge investment of time and energy that other actors invest when they are trying to raise attention to policy problems and propose particular solutions. This involves identifying the dynamics of multi-level policymaking, learning about how policymakers think about policy problems, and how to form coalitions with other powerful actors. A glossy report passed on by a 'knowledge broker', or a few afternoons in workshops looks paltry in comparison.

Second, this knowledge gap also undermines discussions of the barriers to policy change. The literature on the 'adaptation deficit' is largely atheoretical and, as such, does not provide a coherent explanation for a lack of policy progress, despite dozens of case studies identifying similar barriers. This literature would be improved with reference to well-established policy concepts – the role of actors, institutions, networks, context, events, and ideas – and the policy theories that help explain key policymaking dynamics.

Many articles in environmental science make calls to emulate the tenets of EBM. They identify, correctly, the advantages of systematic reviews, to generate a more convincing sense of accumulated knowledge, and policy synopses, to provide short and accessible guides to policy action. Yet, they do not make equally useful calls to emulate policy studies. The latter is crucial to help us identify the key tenets of EBPM which apply to all policy studies – the evidence does not speak for itself, the demand does not match the supply, and the role of evidence is unclear in complex policymaking systems – and the tenets which are generally absent or not well articulated in the health and environmental sciences literature: scientific dissemination is about simple messages and persuasion, not summaries of technical data; providing evidence effectively involves developing a long term strategy based on forming coalitions with allies; this strategy should involve identifying where key decisions are made in multi-level systems; scientific evidence does not settle political decisions; and, most political actors do not share the same faith in scientific practice and a hierarchy of evidence.

## Chapter 5 – Conclusion: how should we respond to these limits to EBPM?

In this concluding chapter I present a general argument, on the nature of the policy process and how 'the evidence' fits in, and a specific argument tailored to the advocates of a more effective use of evidence in health and environmental policy and policymaking. I consolidate the message of the book - if you want to inject more science *into* policymaking you need to know the science *of* policymaking – by revisiting the meaning of EBPM, and the need to move on from a narrow analysis of the 'barriers' to using evidence and policy.

From there, I provide a brief essay on the practical and normative implications of 'bounded EBPM'. I discuss how scientists, seeking to influence the policy process, can act in a more informed way, to consider the extent to which EBPM *can* and *should* become more like the 'comprehensively rational' ideal. Should scientists stop bemoaning the real world and start adapting to it? Should they accept the description of 'bounded EBPM' but reject it as a prescription?

I consider alternative ways to think about EBPM, considering the legitimate role of elected policymakers, to pay selective attention to scientific evidence, and weigh it up against the preferences of other participants in the policy process, such as 'the public', the users of public services, and the organisations charged with implementing policy. This allows us to situate the role of EBPM in a wider context, to compare a series of reference points for policymakers – including the need to use evidence and consult experts, and to represent and be accountable to the public – when they decide how to act.

### What does the lack of evidence-based policymaking mean?

The case studies of health and environmental policy largely confirm that it is too easy to bemoan the lack of evidence-based policymaking without being clear on what it means. There is great potential to conflate a series of problems that should be separated analytically because they have different implications:

- *The lack of reliable or uncontested evidence on the nature of a policy problem*. In some cases, (a) complaints that policymakers do not respond quickly or proportionately to 'the evidence' go hand in hand with (b) admissions that the evidence of problems is patchy. The use of equivocal evidence feeds into a wider political process in which actors compete to address policymaker uncertainty and provide the dominant way to frame or understand policy problems.

- *The tendency of policymakers to pay insufficient attention to pressing, well-evidenced, problems*. The evidence of a problem is relatively clear, but policymakers are unable to understand it, unwilling to address it, or more likely to pay attention to other problems. In such cases, the use of evidence to identify a problem can only take us so far, and policymakers will often pay little attention unless a well worked out solution is available.

- *The lack of reliable or uncontested evidence on the effectiveness of policy solutions*. Scientists are clear on the size and nature of the problem, but the evidence on solutions is patchy. Consequently, policymakers may be reluctant to act, or invest in expensive solutions, even if they recognise that there is a pressing problem to solve.

- *The tendency of policymakers to ignore or reject the most effective or best-evidenced policy solutions*. The evidence on the relative effectiveness of some solutions may be relatively clear, but this does not mean that they should be adopted. Policymakers weigh up not only the evidence on impact but also cost and value for money, the opportunity cost (what other problems could they solve with the same investment elsewhere?), and political feasibility. The evidence on solutions only covers one narrow part of a multi-faceted decision.

- *The tendency of policymakers to decide what they want to do, then seek enough evidence, or distort that evidence, to support their decision*. Even in these cases, we would need to recognise (a) the legitimate decision of policymakers to pay attention to different forms of evidence, and (b) their reluctance to act on the basis of a single report or piece of evidence. Further, the appearance of distortion may relate more to the need for policymakers to act quickly and often in the absence of unequivocal information. In such cases, they need just enough information to get them over the line, a practice that may seem alien to academic scientists with the time to wait for greater certainty.

**What are the main 'barriers' to the use of scientific evidence in policy?**

This lack of clarity combines with a lack of appreciation of the key 'barriers' to the use of evidence in policymaking. A large part of the literature, produced by health and environmental scientists with limited reference to policy theory, identifies a gulf in cultures between scientists and policymakers, and suggests that to solve this problem is to address a key issue in EBPM. Or, it suggests that scientific information, provided in the right way, can address the problem of bounded rationality in policymakers. If so, the failure of politicians to act accordingly indicates a lack of 'political will' to do the right thing.

Yet, the improved translation of scientific evidence contributes primarily to one aspect of bounded rationality: the reduction of empirical *uncertainty*. It contributes less to a wider process of debate, competition, and persuasion, to reduce *ambiguity* and establish a dominant way to frame policy problems. Scientific evidence cannot solve the problem of ambiguity, but persuasion and framing can help determine the demand for scientific evidence. It would therefore be a mistake to focus on simple knowledge exchange at the expense of meaningful engagement in policy debate.

To address this second aspect of bounded rationality, we need to understand how policymakers use emotional, ideological, and habitual short cuts to understand policy problems. This is less about packaging information to make it simpler to understand, and more about responding to the ways in which policymakers think and, therefore, how they demand information. Or, strategies to address ambiguity and set the policy agenda can

involve using emotional and often personal stories to draw policymaker attention to problems. This takes scientists well outside their comfort zone, and many may prefer to remain aloof from the political process to maintain an image of objectivity (or to remain guarded, to protect an image of an objective expert). This may be appropriate, but it is important to recognise that it is a choice: to produce scientific evidence and accept its limited or unpredictable impact on policy and policymaking.

**What should we do with these insights: adapt to the policy process?**

If scientific advocates choose to engage in a more meaningful way, and adapt to the demands of the policy process, they should focus on two factors. First, work out how policymakers and influential actors think, and consider how to respond. We may use policy theories to explore how actors pursue goal-oriented framing strategies: the 'policy entrepreneurs' who exploit the vagaries of policymaking systems; the 'policy monopolists' who frame issues as 'solved' or 'technical' to minimise external interest; the 'venue shoppers' who exploit potential lurches of attention; and, the actors who use persuasion to exploit ambiguity to win framing contests. Such actors recognise that framing strategies involve 'a mixture of empirical information and emotive appeals' (True et al, 2007: 161). In such cases, the process may be complicated but we can learn how the system works and develop strategies within it.

Things are less simple if policymakers are guided primarily by their gut or emotions. If policymakers make quick, biased, emotional judgements, then back up their actions with selective facts, it may be more difficult to influence how they think (or, we may face greater ethical problems about how far we are willing to go to support a particular government agenda). It may be tempting to wait for a change of government or policymakers, but most of the 'pathologies' of the policy process will not change with a change of personnel.

We often use bounded rationality to explain what happens when the policymaking process cannot be 'optimal', in the sense that it is based on incomplete information and an imperfect ability to process it. In many cases, the science of policymaking goes not further than explaining the effects of bounded rationality. However, a greater focus on psychology may highlight the alleged potential to make the wrong decisions. This is partly the focus of Alter and Oppenheimer (2008) when they argue that policymakers spend disproportionate amounts of money on risks with which they are familiar, at the expense of spending on things with more negative effects, producing a 'dramatic misallocation of funds'. They draw on Sunstein (2002), who suggests that emotional bases for attention to environmental problems from the 1970s prompted many regulations to be disproportionate to the risk involved. Further, Slovic's (2010: xxii) work suggest that people's feelings towards risk may even be influenced by the way in which it is described, for example as a percentage versus a 1 in X probability.

Haidt (2001: 815) argues that a focus on psychology can be used to improve policymaking: the identification of the 'intuitive basis of moral judgment' can be used to help policymakers 'avoid mistakes' or allow people to develop 'programs' or an 'environment' to 'improve the quality of moral judgment and behavior'. Similarly, Alter and Oppenheimer (2009: 232) worry about medical and legal judgements swayed by fluid diagnoses and stories. These

studies compare with arguments focusing on the positive role of emotions of decision-making, either individually (Constantinescu, 2012; Frank, 1988; Elster, 2000) or as part of social groups, with emotional responses providing useful information in the form of social cues (Van Kleef et al, 2010).

Policy theory does not shy away from these issues. For example, Schneider and Ingram (2014) argue that the outcomes of social construction are often dysfunctional and not based on a well-reasoned, goal-oriented strategy: 'Studies have shown that rules, tools, rationales and implementation structures inspired by social constructions send dysfunctional messages and poor choices may hamper the effectiveness of policy'. However, part of the value of policy theory is to show that policy results from the interaction of large numbers of people and institutions. So, the poor actions of one policymaker would not be the issue; we need to know more about the cumulative effect of individual emotional decision making in collective decision-making – not only in discrete organisations, but also networks and systems.

Second, consider the extent to which policymakers control the policy process. Most policy theory challenges a naïve attachment to 'rational' policymaking, which implies top-down control of the system (Sanderson, 2009: 701; McCaughey and Bruning, 2010). At the other extreme, a focus on socioeconomic context suggests that policymakers are largely reacting to events at least as much as influencing them. Indeed, some theories highlight the role of policymaking systems in which outcomes seem to emerge in the absence of any meaningful sense of policymaker control.

At the very least, policymaking takes place in an environment which contains many policymakers and other influential actors. Our understanding of EBPM shifts, from the idea of a centralised process in which a small number of actors make choices at discrete points in time, towards a continuous process of policymaking and delivery.

If the policy process is messy and unpredictable, we might seek pragmatic ways to adapt and engage (see Stoker, 2010: 55-7). We can derive some broad conclusions about how to adapt from policy theories (Weible et al, 2012; Greenaway, 2008: 497-9; Smith, 2013; Stoker, 2013):

1. It is important to know where the 'action' is taking place, so the first strategic step is to recognise the often-central role of subsystems (and, in Westminster systems, the peripheral role of Parliament in the policy process).

2. Learn the 'rules of the game' within subsystems and related institutions, since a knowledge of appropriate behaviour is crucial to develop reputations, within government, built on reliability, word of mouth and trust.

3. If persuasion is at the heart of a policy process riddled with ambiguity, we would frame our evidence to make it attractive to actors with particular beliefs and incentives to act.

4. This could involve forming coalitions with other actors in the process, based on the knowledge that policymakers seek many sources of information.

5. This is generally a long term strategy based on the training required to generate an understanding of how: (a) coalitions analyse, interpret and respond to evidence; and, (b) 'local knowledge' underpins subsystems (Weible et al, 2012: 9-15).

Beyond relatively stable subsystems, we may have to adapt to unpredictable levels of policymaker attention, which produce periods in which new evidence is gradually accepted within a political system, often followed by lurches of attention and a disproportionate response to evidence. We know that some issues take off quickly (Baumgartner and Jones, 1993), but it is easier to explain why than predict when. We know that 'policy entrepreneurs' can have a role, as the exceptional people who exploit political conditions to further their favoured solutions, but that they are 'surfers waiting for the big wave' rather than people who control policy processes (Kingdon, 1995: 225; 1984: 173; Cairney, 2013b: 281; Lustick, 2011: 204; Mintrom and Norman, 2009). 'Windows of opportunity' can be exploited, but it takes a long term investment to wait for that time (Weible et al, 2012: 15). In turn, the meaning of 'timely' evidence changes: it can involve the development of solutions to anticipate a lurch of policymaker attention to problems, or a more routine process of advocacy within policy networks.

We also have ethical and belief-based choices to make about which coalitions to join, and the extent to which we are willing to cooperate with others to produce a negotiated outcome, when faced with the possibility of loss or 'stalemate' (Weible et al, 2012: 8), particularly in fields - such as tobacco, alcohol and drug control, energy, and climate change - in which some members may demonise their competitors and accept short term losses for long term gains. There are similar ethical issues surrounding the 'social construction' of populations, based on accepting government legitimacy (and some public support) but challenging emotionally-driven, stigmatizing and often counterproductive policies (2012: 16).

**Should we criticise or applaud the policy process?**

Should we accept the realistic description of bounded EBPM but seek ways to get closer to an ideal of comprehensive rationality or EBPM? Lindblom (1959; 1964; 1979) famously rejected comprehensive rationality as an ideal, for two reasons. The first was practical: given the general limits on policy change, and on the power of policymakers within political systems, it is better to focus on a small number of realistic options than seek comprehensive searches for information, which have large opportunity costs (Cairney, 2012a: 100).

The second was normative: there are better ways to measure 'good' policymaking. Lindblom focused on the ability of a political system to produce policy based on widespread agreement (Cairney, 2012a: 109). Incrementalism was as much about politics (don't change policy radically from an agreed position) as 'rationality' (don't waste time researching options that divert radically from that position). Consequently, the solution was political: the ideal should be a pluralistic political system, as an arena for bargaining and compromise, setting the agenda for policy analysis (although Lindblom accepted that the US political system did not live up to the ideal).

There are similar issues to be discussed with 'comprehensive EBPM': is it an ideal? We can reasonably say 'yes' or 'no' if EBPM resembles comprehensive rationality and requires that a small number of policymakers control the policy process from its centre. We might say 'yes', if committed to a Westminster-style centralist model in which a small group of ministers are responsible for policy and accountable for their decisions to the public via Parliament. We might say 'no' if we have concerns about the unintended consequences of closing the evidence-policy gap by: accepting an alleged scientific consensus on the evidence; and, providing a clear link between scientists and politicians who centralise policymaking. A narrow idea of evidence-based policymaking from the top-down minimises the role for debate, consultation and other forms of knowledge.

Alternatively, a government may adopt a more open approach to policymaking – consulting widely with a range of interest groups and public bodies to inform its aims, and working in partnership with those groups to deliver policy. This approach has important benefits – it generates wide 'ownership' of a policy solution and allows governments to generate useful feedback on the effects of policy instruments when introduced in different areas. It gives local actors the discretion to use good judgement when importing lessons from success stories elsewhere (Cartwright and Hardie, 2012: 163).

On this basis, it would be difficult to maintain a separate EBPM process in which the central government commissions and receives the evidence which directly informs its aims, to be carried out elsewhere. If a government is committed to a less top-down policy style, it adopts the same approach to evidence, sharing it with a wide range of bodies and 'co-producing' a response. If so, the evidence-to-policy process becomes much less linear and simple, and more like a complicated and interactive process in which many actors negotiate the practical implications of scientific evidence, considering it alongside other sources of policy relevant information (Nutley et al, 2013; Williams and Glasby, 2010).

Pragmatic EBPM is about recognising the limitations of evidence and our ability to act on it: hence complexity theory's focus on trial-and-error, adaptability to changing circumstances, and learning, as practitioners update their knowledge constantly through experimentation and evaluation (Sanderson, 2009: 706). So, for example, RCTs may provide information in that spirit, but without providing a blueprint for action, to be 'scaled up' uniformly. A preliminary assessment of 'what works' may be followed by constant re-evaluation (using a range of methods, not restricted to RCTs) as policies are rolled out in different areas and provide different types of feedback. Policies become 'hypotheses' based on more or less certainty (2009: 711; Taylor, 2013: 17; Pawson, 2006: 72; Cartwright and Hardie, 2012; Weinberger, 2014).

This discussion provides a *description* of the policy process and a defendable *prescription* for policymaking. It takes us some distance from the idea of objective evidence-driven policy, based on external scientific standards and a hierarchy of methods, towards treating evidence as a resource to be used by actors, within political systems, who draw on different ideas about the hierarchy of evidential sources. A wide range of actors may have a legitimate role in evaluating the appropriateness of policy interventions and, in some cases, their effectiveness.

As such, scientific evidence is not, and should not be, a resource that is controlled solely by the scientists producing it. This is a conclusion that seems to be accepted more in studies of environmental policy (chapter 4) than in health, albeit with a tendency for relevant studies to struggle to link the process to a wider understanding of policymaking.

*Recognising the legitimate role for politics and competing principles*

Some exasperation with EBPM may result from the time it takes to understand how the system works and, therefore, understand how to operate within it. Scientists may initially bemoan their need to: compete or cooperate with a wide range of actors (more knowledgeable of the policy process) to secure a policymaker audience; present evidence in an artificial or manipulative way to secure attention; maintain contact with several government departments (and accept a peripheral role in some); and, react quickly to shifts in policymaker attention and a very limited demand for information.

This exasperation should not be confused with a rejection of the political system in which evidence is used to inform policy. It is difficult to reject the idea that policymaking should combine 'expert scientific advice with a responsiveness to public values', to recognise that decisions on issues such as acceptable risk and value for money are infused with value judgements and cannot be settled by experts (Jasanoff, 1986: 5; Weale, 2001: 414). As such, it is essential to combine scientific evidence with public values. In some cases, this may involve direct public participation in government consultations or commissions or, in fewer or less routine cases, 'deliberative' exercises such as citizen juries, or referendums (Weale, 2001: 414-6). Yet, in all of these examples, the proportion of the public that participates in such exercises is small, and representative democracy – in which people elect politicians to make decisions on their behalf – is the more frequent mechanism to legitimise policies by combining evidence and values.

In some cases, governments are explicit about this combination of evidence-based policy aims and value-based governance principles. For example, the UK and Scottish Governments are pursuing the reform of public services to reduce acute service delivery and invest in 'early intervention (Cairney and St Denny, 2015). In tandem, they promote principles including a commitment to tailor public services to their users (encouraging a focus on the 'assets' of individuals, and inviting users to 'co-produce' their services), promote performance management measures which stress long term outcomes-based measures of policy success (which reduces the ability of central governments to monitor and control performance) and encourage 'localism' and partnership between local public bodies. Therefore, although they express a commitment to EBPM, to identify which projects produce the most benefit and deserve investment, they rely on local partnerships and user-based 'co-production' exercises to determine what to do with the evidence.

This policy has a direct impact on the identification of evidence-based success, since it is difficult to distinguish between the substance of policy and governance principles (Cairney, 2015c). In medicine, it is more common to distinguish between the 'active ingredient' and 'delivery vessel' (such as, in ibuprofen, the isobutylphenyl and gelatine capsule) to produce

two separate questions: what is the biological cause and effect, and how do we ensure that people take the medicine? In public policy these questions become harder to separate. It is possible for governments to care at least as much about the delivery vessel, based on a set of governance principles that are easier to agree, than the evidence of a policy's active ingredient, which is difficult to determine. Instead, when they evaluate policies, policymakers, practitioners and stakeholders balance the limited evidence on 'what works' with their greater certainty that they are *doing the right thing*.

**Conclusion: what does EBPM mean in the real world?**

The policymaking literature explains why there cannot be a direct and unproblematic link between scientific evidence and policy decisions and outcomes. Beginning with the ideal-type of 'comprehensive EBPM', we can identify the conditions required to minimise an evidence-policy gap: it is possible to produce a scientific consensus based on an objective and comprehensive account of the relevant evidence; the policy process is centralised and power is held by a small number of policymakers; scientific evidence is the sole source of knowledge for policymakers; policymakers understand the evidence in the same way as scientists; and, they have the motive and opportunity to turn the evidence into a solution that is consistent with, and a proportionate response to, the policy problem.

In the real world, the evidence is contested, the policy process contains a large number of influential actors, and scientific evidence is one of many sources of information. Policymakers base their decisions on a mixture of emotions, knowledge and short cuts to gather relevant evidence. This takes place in a policy process containing subsystems with their own rules on who, and what sources of evidence, to trust, and often a 'monopoly' on how to understand problems and how the evidence relates to them. Attention to particular kinds and sources of evidence can lurch unpredictably, as events prompt policymakers to shift their focus quickly, or ambiguity and uncertainty contributes to shifting attention to different policy images. The use of evidence is a political process; an exercise of power to characterise people and problems, and to justify beliefs and decisions. Policymakers use scientific evidence in a limited way before making major decisions.

Armed with this knowledge, as scientists we can choose how to adapt to those circumstances by, for example: identifying where the action takes place; learning about the properties of subsystems, the rules of the game, and how to frame evidence to fit policy agendas; forming coalitions with other influential actors; and, engaging in the policy process long enough to exploit windows of opportunity.

This knowledge also allows us to reflect on our legitimate role in this process. Scientists provide information to inform the deliberations of policymakers, who claim a legitimate policymaking role, and may engage in other forms of 'good' policymaking, by consulting widely and generating a degree of societal, governmental and/or practitioner consensus. If so, this highlights the importance of the use of evidence throughout the system rather than simply from the top down. If policymaking systems are multi-level and power is diffuse, then the use of evidence should be seen in the same way. It is about how actors make sense of, and use,

evidence, throughout the system, not simply how they deliver evidence-based policies produced from the centre.

This way of thinking about the role of evidence in a complex policy system may help us reconcile a real world description of the policy process with our prescription for the use of evidence in policymaking. We began with the simple normative definition of comprehensive EBPM: policymakers should base their decisions primarily on scientific evidence. We end with the less satisfying, but more realistic, definition of bounded EBPM: policymakers find simple ways to make decisions after weighing up a wide range of evidence, of which science forms one part. Scientists are part of a policymaking process in which evidence may reduce uncertainty but not ambiguity, and the use of scientific evidence represents one of many aspects of good policymaking.

**Epilogue: the wider application of these insights**

When I began writing this book, I felt that the audience was largely professional: the scientists who produce new knowledge but feel that the evidence does not influence the decisions of policymakers. Some simple insights and evidence about the policymaking process – the science of policymaking – could help them understand and adapt to key obstacles.

However, I found that the argument was just as relevant to a wider audience who were making simplistic arguments about policymakers ignoring science and reason when making decisions (Cairney, 2015d). In such cases, science is often raised up on a pedestal as something that should not be questioned by mere politicians, particularly when they are clearly using ideology, self-interest, or economic considerations to reject 'scientific fact'.

This is naïve to say the least. It is not appropriate to assert the superiority of science and scientists. Rather, scientists should seek to understand the policy process and engage with relevant policymakers to assess how best to influence their decisions. In such cases, a useful analogy is the scientific experiment. This book provides some insights into the regularities of policymaking systems, and general strategies to adopt, but it is not a substitute for trial-and-error studies built on theory-driven real world engagement.

It is more difficult to work out how to inform the public about such processes, particularly in the current era in which scientists enjoy a far better reputation than politicians in the eyes of the public. In cases where scientists complain about a lack of EBPM it has great potential to *exacerbate* a loss of trust in politics and policymaking. However, I hope that by identifying the value of the politics of evidence-based policymaking that we can address that problem.

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[i] Take the example of health policymaking initiatives in Ontario. Lomas and Brown (2009: 912) describe the decision by funded academic centres to balance their own research interests with those of government, and to give some reports to government 60 days before they are released to the public. This describes the compromises of which scientists should be aware, but not what to do or if these actions are appropriate or effective. See also van Egmond et al (2011: 31) on the oxymoronic need for 'close distance'; for scientific public bodies to be near enough to government departments to know their agenda, but far enough away to look impartial (as in the tale of Goldilocks, this may involve trial-and-error rather than a blueprint).

[ii] Systematic reviews identify the word 'broker' but the individual studies to which they refer do not add up to a coherent account of who they are or what their role is (Dobbins et al, 2009: 2; Ritter; 2009: 72; Lewig et al, 2010: 476; El-Jahardi et al, 2012: 9; Jack et al, 2010; Jönsson et al, 2007: 8; Ettelt and Mays, 2011: 58; Hanney et al, 2003: 15-6; Chambers et al, 2012: 144; van Egmond et al, 2011: 34).

[iii] This is a problem to note when articles make casual reference to policy theories (e.g. van Egmond et al, 2011: 29 on the ACF) and with insufficient focus on the theory to make the analysis useful to people unfamiliar with it (e.g. Blackman et al, 2012: 49, Haynes et al, 2011: 567, Hinchcliff et al, 2011 and Hunsmann, 2011on multiple streams). Even the more thorough studies devote a short paragraph to each approach (Hanney et al, 2003: 5-6).

[iv] This is not to say that RCTs have no place in policymaking - indeed, UK policy scholars such as John et al (2013) explore their value in multiple interventions, while the UK's Behavioural Insights Team extols their virtue in more general terms (Haynes et al, 2012).

[v] For a forthcoming co-authored paper on the barriers to evidence in environmental policy.

[vi] Barrett et al (2005); Clare and Creed (2014); Carneiro and Danton (2011); Carneiro and da-Silva-Rosa (2011); Cook et al (2013); Curry and Maguire (2011); Cvitanovic et al (2013); Cvitanovic et al (2014); D'Aquino and Bah (2014); Dhanda and Murphy (2011); Dicks et al (2014); Gan et al (2011); Hamilton and Penny (2015); Haug et al (2010); Hickey et al (2013); Howard (2015); Huntjens et al (2011); Johnstone et al (2010); Lalor and Hickey (2014); Louwagie et al (2012); Malcomb et al (2014); Molnár (2014); Naughton and Hynds (2014); Nilsson et al (2008); Rickards et al (2014); Rissman and Smail (2015); Rowe (2013); Stephens et al (2011); Stringer and Dougill (2013); Taylor et al (2013); Webb et al (2012); Wellstead and Stedman (2014); Yuen et al (2013)

[vii] Curry and Maguire (2011); Dhanda and Murphy (2011); Gan et al (2011); Johnstone et al (2010); Malcomb et al (2014); Naughton and Hynds (2014).