Ways of Knowing

Competing Methodologies in Social and Political Research

Second Edition

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Despite all the time we have taken, and the help we have received, we alone are responsible for any errors that remain. We do hope they are not many.

We close with a word of gratitude for Ola Listhaug, the patriarch of our department. Ola has been instrumental in allowing us the freedom and time to pursue these interests (and many others). It is for this reason that we have dedicated our book to him.

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Chapter 1

Introduction

> What we shall see is something like a battle of gods and giants going on between them over their quarrel about reality.
>
> Plato, *The Sophist*, 246

For as long as can be recalled, there have been arguments over ways of knowing. Gods, giants and even reasonable people cannot seem to agree about the nature of reality and how we can understand it. There are – quite simply – different ways of knowing.

When battles over the nature of reality are between gods and giants, we can expect sparks to fly. But the battles between mere mortals, or even scientists, can also generate a great deal of heat. As much as we like to pretend it is otherwise, the scientific process is not driven solely by the ideals of impartial and measured dialogue, drawing on empirical and rational support. Rather, presuppositions, aggressive rhetoric, economic and legal muscle, and authority all have a role to play in securing scientific knowledge. This book aims to explain some of the root causes of these heated exchanges. In particular, we introduce different ways of knowing and how these affect the methods we choose to study social phenomena.

Beneath any given research design and choice of methods lies a researcher's (often implicit) understanding of the nature of the world and how it should be studied. These underlying priors provide researchers with the philosophical ballast necessary to address important questions concerning the nature of truth, certainty and objectivity in a given project. These are very important issues, but they are receiving less and less of the attention they deserve from practising scientists. The reason for this is not difficult to discern. Contemporary social scientists have a plethora of new and more sophisticated methods at their disposal. As a consequence, they are devoting more time and energy to mastering these new methods. The result is predictable, if unfortunate: much of contemporary social science is driven by a given researcher's familiarity with particular methods. This preoccupation often comes with very little reflection about how a given method corresponds (or doesn't) to the researcher's underlying methodology.

Our book aims to correct this unfortunate shortcoming by focusing on the important ways in which methodologies and methods relate to one another. Toward that end we use this chapter to introduce two central methodological perspectives: naturalism and constructivism. These two methodologies can be said to constitute the main camps in the battle over reality in contemporary social science research: they are today's gods and giants. For this reason they provide the basic design of the book that follows: the first half is dedicated to how methods are employed in a naturalist methodology, while the latter half looks at the same methods as employed in a constructivist methodology.

Because these methodological traditions draw on different understandings of the nature of the social world, and on different ways of coming to understand that world, each of them employs common methods in different ways. For example, both naturalists and constructivists use comparisons, but they use them differently. Our primary objective is to highlight these differences so that students will better understand how their methodological priors affect the methods they choose and the ways in which they use them. To underscore these differences, the closing part of this introductory chapter provides an overview of the book's design.

But it would be a mistake to describe this battle between gods and giants only in terms of their differences: both methodological traditions are allies in the fight against ignorance and sloppy thinking. They share many common weapons and positions in this struggle, and it is just as important to embrace these similarities as it is to focus on the differences that separate the two traditions. After all, both naturalists and constructivists share an appreciation of honesty; an attention to detail and empirical accuracy; an embrace of reason and the utility of rhetoric; the need to address and minimize unwanted bias; and the desire to produce knowledge which can subsequently be reproduced by others who follow in their footsteps.

Ultimately, we hope to encourage students to become more aware of their own methodological positions and how these affect their research. We also hope to make students more aware of the various ways in which methods can be employed in social science projects. Most of us study social phenomena because we are fascinated by their depth and complexity. With this book, we wish to show how there is a corresponding degree of complexity and depth associated with the ways in which we can come to understand, and explain, these phenomena.

Methodological Foundations

Though they like to hide it from the world, scientists disagree about some pretty fundamental issues. Indeed, this book will depict social scientists differing on a number of these. For example: How do we understand

the nature of the world we study? Is there only one type of scientific knowledge? What is the overall objective of scientific study? How should we assess which methods, data and evidence are appropriate? Amid all these differences, how do we assess competing claims? How do we know who is right? Is one side necessarily right, and the other wrong? How do we know?

To answer these difficult questions, we must begin by simplifying. We do this by suggesting that most work in social science can be grouped under two methodological rubrics, which will be described in much greater detail below. These two different methodologies incorporate radically different views of the world. As a consequence, each methodology employs similar methods in different ways – toward different objectives. It is our contention that many of the most significant differences and major disagreements in social science can be traced back to these methodological differences.

We distinguish between 'methodologies' and 'methods', viewing 'methodologies' as the basic and more comprehensive of the two terms. Thus we agree with Kenneth Waltz, who is worried that students

> have been much concerned with methods and little concerned with the logic of their use. This reverses the proper priority of concern, for once a methodology is adopted the choice of methods becomes merely a tactical matter. It makes no sense to start the journey that is to bring us to an understanding of a phenomenon without asking which methodological routes might possibly lead there. (Waltz, 1979, p. 13)

We concur. And we have written this book with an eye toward introducing the student to the ways in which methods and methodologies are related.

One useful way to consider this relationship is to think of methods as tools, and methodologies as well-equipped toolboxes. With this analogy, methods can be understood as problem-specific techniques. Thus we can expect electricians to view the world differently than carpenters (that is, they aim to resolve different types of problems). Each relies on a different mixture of tools or approaches to solve the problems he encounters. This is a good thing: when inappropriate tools are employed, a worker can inflict great damage. Thus we should not be surprised to find the electrician's toolbox filled with a different set of tools than those filling the carpenter's. On the other hand, we should not be surprised to find that the two people sometimes use identical tools for certain purposes.

Notice too that this analogy implies that the different occupations provide specialization, while complementing one another. After all, a well-built home needs both skilled electricians and carpenters, and the tools, toolboxes and skill sets of these different workers complement one another.

If this analogy is useful, it is alarming for a number of social scientists who use the term 'methodology' as a fancy word for statistical methods. Thus the central theme of John E. Jackson's (1996) overview of political methodology is the importation of econometric (read 'statistical') methods. For such scholars, it would seem, there is only one truly scientific method, and everything else is cold leftovers: having mastered the use of a hammer, the whole world around them can be understood in terms of nails. We hasten to note that this myopic affinity to a particular method is not restricted to statisticians: too many scholars, from a number of different methods backgrounds, are bound to a particular approach.

If we accept that methodologies imply real and important differences in understanding the world, then we can follow Hughes (1990, p. 11) in arguing that students should be aware of the methodological undergirdings of the social studies they read and (eventually will) produce:

> every research tool or procedure is inextricably embedded in commitments to particular versions of the world and to knowing that world. To use a questionnaire, to use an attitude scale, to take the role of a participant observer, to select a random sample, to measure rates of population growth, and so on, is to be involved in conceptions of the world which allow these instruments to be used for the purposes conceived. No technique or method of investigation (and this is as true of the natural science as it is of the social) is self-validating: its effectiveness, i.e. its very status as a research instrument making the world tractable to investigation, is, from a philosophical point of view, ultimately dependent on epistemological justifications.

In theory, this seems like a clear and reasonable statement. However, in practice it is hard to follow up. The methodological diversity of the social sciences can be confusing. For the new student of social science it may be helpful to know that 'methodology' often appears as one member in a trio from the philosophy of science, the two others being 'ontology' and 'epistemology'. These are the three musketeers of metaphysics – one of the more speculative fields of philosophy. *Ontology* is the most abstract of the three terms. It means the study of being – the study of the basic building blocks of existence. The fundamental question in the field of ontology is: 'What is the world really made of?' *Epistemology* is a more straightforward term; it denotes the philosophical study of knowledge. 'What is knowledge?' is the basic question of epistemology.

The third musketeer, *methodology*, is also a fairly straightforward term. It refers to the ways in which we acquire knowledge. 'How do we

know?' is the basic question in methodology. Perhaps the easiest way to convey this is to break the word down into its component parts: methodology – that is, the study of methods, or the study of which methods are appropriate to produce reliable knowledge. This question of appropriateness covers both ontological and epistemological territory.

While methodology is a simple enough term, it is commonly wrapped in ambiguity, because 'methodology' is sometimes used as a fancy synonym for 'method'. Thus it is worth repeating that these two terms are *not* synonyms. In this book, method refers to research techniques, or technical procedures of a discipline. Methodology, on the other hand, denotes an investigation of the concepts, theories and basic principles of reasoning on a subject. The methodology of the social sciences, then, is to be understood simply as philosophy of science applied to the social sciences.

Ancient philosophical ghosts often frighten the new student investigating conflicting ontological, epistemological and methodological clues. Worse, modern methods courses (and their texts) often shelter students from their fears by assuming a single methodological, epistemological and ontological starting point. As we shall see in the chapters that follow, this often creates greater confusion later, when students observe how similar methods might be used in different guises toward different objectives, and under different ontological presumptions. It is our experience that the beginning social science student can be helped by a clear overview of how methodology and method choices relate to one another.

This book aims to provide that overview. Our objective is to supply the larger context into which more focused methods texts can be inserted and employed. In doing so, we hope to clarify some of the misunderstandings that students often encounter when they do not fully recognize the way in which one's choice of methods often (implicitly) reflects contentious methodological assumptions. Consequently, we hope to narrow the gap that now separates the implied ontologies and the methods employed by so many of today's social scientists (Hall, 2003).

In doing so, we raise some difficult and awkward questions about the relationship between the two main perspectives. Some authors – for example, Marsh and Furlong (2002, p. 17), argue that one's ontological and epistemological positions are like skins – once you've got one, you're pretty much stuck with it. We are not convinced. We would rather liken ontological and epistemological positions to jackets that you can put on and take off, depending on where you want to go and what you want to do. So too with methods and methodologies – these should be changed in accordance with the ontological and epistemological status of the question under study.

We think social science is better served by researchers who master several methods and methodologies, who can self-consciously choose among concepts and theories, and who command many basic principles of reasoning. In the text that follows, we provide several illustrations of how it is possible to move between methodological traditions – often with great success. Our aim is to provide students with enough methodological awareness that they can become informed and careful consumers of social studies. Though we shall touch on ontological and epistemological issues, we do so only lightly; we leave the ontological and epistemological proselytization to others.

This way of thinking about the world is perhaps most familiar to students of International Relations (IR). For generations, IR students have been taught to interpret the world through three disparate approaches, or ideological perspectives: liberalism, realism and radicalism (or Marxism). These students learn to recognize the different actors and levels of analysis associated with each approach, and are taught to understand the world from the vantage point of each perspective. Many of us were taught to think of these different approaches in terms of 'different-coloured lenses', which implies that the thing being studied is the same for all viewers, while the way it is viewed might vary from lens to lens. The objective of this common practice was *not* to find the one approach that 'best' fits the real world, but to emphasize the fact that the world can be perceived in different and contrasting ways.

This tradition might be compared with that of the modern (mainstream) economics tradition, which subscribes to a remarkably narrow ideological standard, steeped in a naturalist methodology. While this methodological commitment may be the reason that economics is known as the queen of social science, recent developments suggest that the empress has no clothes. In particular, the inability to predict the Great Recession of 2008 revealed a significant fissure among economists, where much of the discussion has been concerned with the problems of building social understanding on such a narrow ontological and methodological base (see, for example, Krugman, 2009).

We encourage social scientists to embrace a broader, more pluralistic approach to knowledge. As social scientists, we need to understand that there can be different types of knowledge, that knowledge can be accessed in a number of different ways, and that knowledge is not always unrelated to interest. As a consequence, we need to have access to different types of knowledge and ways of knowing.

This book is designed to introduce some methodological variety to those embarking on the study of social science. Different social scientists approach the world with different assumptions about the way it actually is, and how they should study it appropriately. As a consequence,

scientists who come from different methodological traditions often use standard methods in different ways. While some of us will sympathize with one methodology more than another (and there is nothing wrong in that!), all of us must be aware of the existence of these differences and how they affect the ways in which methods are used.

Though we shall spend a great deal more time in subsequent chapters (Chapters 2 and 8, in particular) describing the basic philosophical components to various methodologies, we want to use this introduction to lay out briefly the methodological terrain as it appears to the practising social scientist. This terrain is dominated by two methodological traditions: naturalism and constructivism.

We are aware that philosophers of science may feel uncomfortable with such a simple depiction of the scientific world. But our intention is to help students understand the nature of contemporary social science research (not to outline the nature of contemporary philosophical debate), and we contend that this research is still strongly characterized by this simple methodological dichotomy. Indeed, we think that this methodological divide is the most important cleavage separating contemporary social scientists.

We hasten to add that we have created these methodological traditions as ideal types – they do not exist independently in the world. As is often the case in science, we are imposing a simple model that divides the complicated world of social scientists into two competing camps. Worse, since they are ideal types, individual scientists will not feel comfortable in either camp. For this reason, it may be more useful to think of these two methodologies as end points on an imaginary continuum, where individual authors find themselves at home some place in between them.

Indeed, scholars have recently embraced a new approach that attempts to fill the gap that separates naturalism from constructivism. In contrast to the first two methodologies, scientific realism can be seen as a distinct movement, to which philosophers and practitioners of science increasingly claim allegiance. Because it does not offer a unique or distinct ontological position, we only refer to scientific realism in our introductory and concluding chapters to show how it relates to the methodologies that still dominate the field.

Now that we have begun to throw in some pretty large and messy terms (naturalism, constructivism, realism), it is time to describe them in more detail.

Naturalism

How do we know? For most of the twentieth century, and onwards, the social scientist's answer to this question has been made with a nod to the natural sciences. In the push for scientific legitimacy, and the funding that follows in its wake, social scientists have quietly adopted a view of the world that was first articulated in the natural sciences. This view assumes that there is a Real World (big R, big W) out there, independent of our experience of it, and that we can gain access to that World by thinking, observing and recording our experiences carefully. This process helps scientists to reveal patterns that exist in nature but are often obscured by the complexities of life. Thus we call this methodology *naturalism*, as it seeks to discover and explain patterns that are assumed to exist in nature.

In different academic contexts, naturalism is known by many different names. The most common of these is 'positivism', but 'empiricism' and 'behaviouralism' are also used to describe the same basic methodological position. As each of these terms, for a variety of reasons, has fallen into disrepute, or is used as a polemical epithet, we think it is useful to employ a more neutral and descriptive term to capture this methodology's essential characteristics.

Naturalists rely heavily on knowledge that is generated by sensual perception, such as observation and direct experience. For a naturalist, something is true when somebody has seen it to be true (and recorded it as such). As we shall see, naturalists also employ logic and reason. Ultimately, however, reason and logic need to be supported by direct experience if the naturalist is to rely on the knowledge that is produced.

From these core (ontological and epistemological) beliefs, naturalists have developed a rather narrow set of criteria for evaluating the reliability of the knowledge produced. In particular, social scientists have increasingly turned to falsification and predictive capacity as the standards for evaluating their knowledge. From here, mainstream social science has developed a hierarchy of methods that can be used to test our knowledge under different circumstances.

Though it is not easy to summarize a methodological tradition – and we shall examine the naturalist methodology in more detail in Chapter 2 – we might suggest that the naturalist's approach embraces the following six features:

- There exist regularities or patterns in nature that are independent of the observer (that is, a Real World).
- These patterns can be experienced (observed), and these observations can be described objectively.
- Observational or experiential statements (based on these regularities) can be tested empirically according to a falsification principle and a correspondence theory of truth.
- It is possible to distinguish between value-laden and factual statements (and facts are, in principle, theoretically independent).

- The scientific project should be aimed at the general (nomothetic) at the expense of the particular (idiographic).
- Human knowledge is both singular and cumulative.

Perhaps the easiest way to understand the ambitious nature of the naturalist project is to recognize it in the influence and success of Edward O. Wilson's (2003) *Consilience*. Wilson, a biologist accustomed to working with ants, believes that all knowledge is intrinsically unified and interlocked by a small number of natural laws. Using the natural sciences as his model, Wilson sketches an ambitious project: he aims to unify all the major branches of knowledge under the banner of (natural) science. Because there exists a Real World out there, independent of our experience of it; because we can know that World by careful thinking and observation in an objective and falsifiable manner; because such thinking and observations can uncover general patterns and laws that interact in a singular and cumulative project; then the scientific project is an enormous and singular one. This is an elegant and attractive vision, but one that would require a great deal more synthesis and agreement among scientists than exists today, or ever has existed.

Constructivism

Despite the naturalist view dominating modern social science, it has not escaped criticism, nor does it stand alone. Many social scientists are leery of accepting the naturalist's view of the world, as many of the patterns that interest them are seen to be ephemeral and contingent on human agency. For these social scientists, the patterns of interest are not firmly rooted in nature but are a product of our own making. Each of us sees different things, and what we see is determined by a complicated mix of social and contextual influences and/or presuppositions. It is for this reason that we refer to our second methodology as *constructivist*: it recognizes the important role of the observer and society in constructing the patterns we study as social scientists.

As with other methodological positions, constructivists are known by a variety of names, many of which are not particularly endearing. The most common of these is probably 'interpretivism', but constructivism also corresponds to 'Gadamer's hermeneutics, Habermas's Critical Theory … French deconstructionists, post-structuralists, and other similarly suspicious continental characters' (Ball, 1987, p. 2). This methodology is described in more detail in Chapter 8, and the latter part of the book shows how constructivists employ traditional methods. For now, we wish to briefly introduce constructivism and show how it differs from naturalism and why we use it as its methodological counterweight in the overall design of the book.

At the bottom of the differences separating naturalists from constructivists is the recognition that people are intelligent, reflective and wilful, and that these characteristics matter for how we understand the world. Constructivists recognize that we do not just 'experience' the world objectively or directly: our perceptions are channelled through the human mind – in often elusive ways. It is in this short channel between the eye and the brain – between sense perception and the experience of the mind – that we find many challenges to naturalism. When our scientific investigation is aimed at perceptions of the world, rather than the world 'as it is', we open the possibility of multiple worlds (or, more accurately, multiple experiences).

Consequently, constructivists recognize that people may look at the same thing and perceive it differently. Individual characteristics (such as age, gender or race) or social characteristics (such as era, culture and language) can facilitate or obscure a given perception of the world. Recognizing the wilfulness of human agency complicates any attempt to try to capture it in simple, law-like terms (as is common in the naturalist world). Once a social 'law' is known to human actors, they start to exploit it in ways that can undermine its law-like features (Popper, 2002a).

To make matters even more complicated, human agency creates things that have a different ontological status than the objects studied by natural scientists. As Max Weber (1949, p. 81) noted: 'We are cultural beings, endowed with the capacity and the will to take a deliberate attitude towards the world and to lend it significance.' This capacity gives rise to a class of facts that do not exist in the physical object world: *social facts* (such as money, property rights or sovereignty) depend on human agreement, and typically require human institutions for their very existence (Searle, 1995, p. 2).

Because they recognize such ontological diversity and complexity, constructivists tend to draw on more diverse sources and on different types of evidence. While constructivists recognize experience and reason as useful epistemological devices, they also realize that both of these can be influenced by the above-mentioned contextual factors – undermining any claims to their being objective transmitters of truth. Because social contexts are filled with meaning, constructivists find utility in a much broader set of epistemological tools, including empathy, authority, myths and so on.

Given the fact that constructivists focus on the reflective and idiosyncratic nature of knowledge, the overall objective of constructivist science is quite different from its naturalist counterpart. If we follow Quentin Skinner (1975, p. 216), we could say that constructivists try to understand action

> not in causal and positivist terms as a precipitate of its context, but rather in circular and hermeneutic terms as a meaningful item within a wider context of conventions and assumptions, a context which serves to endow its constituent parts with meaning while attaining its own meaning from the combination of its constituent parts.

Rather than uncovering a true account, constructivists seek to capture and understand the meaning of a social action for the agent performing it (as well as for the scholar studying it). If something appears meaningful or real to a social agent, then it may affect her behaviour and have real consequences for the society around her.

While naturalists try to uncover singular truths in a falsifiable manner that corresponds to one true reality, constructivists embrace the particular and use their knowledge to expand our moral sympathies and political understandings. For the constructivist, truth lies in the eyes of the observer, and in the constellation of power and force that supports that truth. As even our descriptions of events are not free from the biases that surround us, constructivists hold little hope of securing an absolute truth: the best we can do is to be honest and open about the way in which our contexts (and those of our subject matter) frame the way in which we come to understand. This is not to say that constructivists are all relativists: there can be better and worse constructivist accounts. Rather, constructivists are more hesitant to claim truth as their own.

With an eye to symmetry, we might list some of the qualities of constructivist research, as a reflection of the naturalist approach:

- The world we study is not singular and independent of the observer: the world includes social facts.
- Observations and experience depend on the perspective of the investigator; they are not neutral and not necessarily consistent across investigators.
- Observational statements can contain bias and can be understood in different ways.
- Even factual statements are value-laden.
- Knowledge gained by idiographic study is embraced in its own right (not as a necessary part in a larger nomothetic project).
- There is value in understanding, and there can be more than one way to understand.

If Edward O. Wilson's (2003) *Consilience* can be seen as an exemplary text in the naturalist tradition, we suggest that Bent Flyvbjerg's (2001) *Making Social Science Matter* can play a similar role for constructivists. Rather than mimic the approaches that have been developed by natural scientists who study the natural world, Flyvbjerg suggests that social scientists should leverage the strength that comes from its rich, reflexive analyses of social facts, value and power. He prioritizes practical, applied knowledge over general, nomothetic, knowledge; promoting what he calls 'phronetic social science' in order to connect knowledge to power and to contribute to practical reason. In short, he hopes to:

> transform social science [in]to an activity done in public for the public, sometimes to clarify, sometimes to intervene, sometimes to generate new perspectives, and always to serve as eyes and ears in our ongoing efforts at understanding the present and deliberating about the future. We may, in short, arrive at a social science that matters. (Flyvbjerg, 2001, p. 166)

Scientific Realism

In recent decades a new philosophy of science has arisen to challenge the dominance of naturalism. In stark contrast to both naturalism and constructivism, scientific realism constitutes a self-conscious school, where scholars pride themselves on their membership (though the name of the club tends to vary by neighbourhood). They are known by many different names – including 'transcendental realists', 'relational realists', 'critical realists' and 'empirical realists' – but most commonly as 'scientific realists'. They are philosophers of science on a mission: they offer a full-fledged metaphysical position by blending some of the most attractive features of both the naturalist and constructivist approaches.

Because of its relative youth, and because it was born in the thin and rarified air of metaphysics, scientific realism has yet to make a noticeable impact on the everyday practice of social science. Still, scientific realism is an approach with much promise, and for that reason it is important to introduce it to the reader. Also, it provides another perspective, from which we can leverage our understanding of both naturalism and constructivism.

In a practical sense, scientific realism straddles the ontological positions of naturalism and constructivism. This, in itself, is worth some reflection, as it helps us to understand the nature of the difference that separates our two main methodological positions. At its ontological core, scientific realism comes closest to naturalism. Scientific realists recognize that there exists a Real World independent of our experience. At the same time they embrace Weber's famous constructivist maxim, that man is an animal suspended in webs of meaning he himself has spun. Scientific realists realize that there can be many layers to the reality they study, and that their access to the one 'Real World' is highly complicated. The more complicated the picture, the closer scientific realists come to the constructivist's point of view. Yet they never let go of the naturalist foundation.

The scientific realist's position is akin to the famous Eastern guru who tells his disciples that the world rests on the back of a tiger, and that the tiger is supported by an elephant, who in turn stands on a giant turtle. When a disciple timidly asks what the giant turtle, in turn, stands on, the guru quickly replies: 'Ah, after that there are turtles all the way down!' In a sense, scientific realism provides a convenient way of avoiding the problem of two different and irreconcilable ontologies. After all, we doubt that there are many constructivists who are willing to reject outright the possibility that a Real World might exist out there, buried deep, deep down, or in significant areas of human endeavour. After all, engineers and physicists are able to send rockets to the moon (or to drop them on terrorist compounds). The relevant (and practical) questions to ask are: How deeply buried is this Real World? How far does it extend into our social experience? Does it make sense to employ research methods that assume it lies just beneath the surface and all around us?

While scientific realists recognize many layers of truth, and share with constructivists a realization that the social world is filled with complexity, they believe that the best way to uncover these buried truths is, ultimately, by way of scientific (read naturalist) approaches (Wendt, 1999). Thus, Ian Shapiro (2005, pp. 8–9) has summarized the core commitment of scientific realism as the 'twofold conviction that the world consists of causal mechanisms that exist independently of our study – or even awareness – of them, and that the methods of science hold out the best possibility of our grasping their true character'.

But the similarities with naturalism tend to stop there. Scientific realists avoid references to 'universal laws' and hypothetic–deductive approaches to explanation. They are critical of those who use falsifiability as a means of distinguishing between science and nonsense. They even question the neutrality of the scientist (and her language!).

In short, scientific realists focus on 'necessity and contingency rather than regularity, on open rather than closed systems, on the ways in which causal processes could produce quite different results in different contexts' (Sayer, 2000, p. 5). Compared to naturalists, scientific realists are willing to open up the scientific project by recognizing the possibility that powers can (and do) exist unexercised. In other words, scientific realists recognize and appreciate the open-ended nature of human exchange.

Where does this discussion lead us? As will soon become apparent, we have much in common with scientific realists. This is especially true with respect to the role of methods. We concur with scientific realists in recognizing that good science should be driven by questions, not by methods.

> Compared to positivism [naturalism] and interpretivism [constructivism], critical realism endorses or is compatible with a relatively wide

> range of research methods, but it implies that the particular choices should depend on the nature of the object of study and what one wants to learn about it. For example, ethnographic and quantitative approaches are radically different but each can be appropriate for different and legitimate tasks – the former perhaps for researching, say, a group's norms and customs, the latter for researching world trade flows. Perhaps more importantly, realists reject cookbook prescriptions of method which allow one to imagine that one can do research by simply applying them without having a scholarly knowledge of the object of study in question. (Sayer, 2000, p. 19)

We agree. We have written this book to help students recognize how methods and methodologies relate, and, consequently, how methods can be employed in a number of different ways and open up to various ways of knowing. More important, we hope that this recognition will help students to realize the utility of tailoring their choice of methods to the problems that interest them (rather than tailoring their problems to the methods they have learned).

Where we differ from scientific realists is in the perceived need to define a new unifying scientific tradition. Scientific realism introduces itself as an approach for those constructivists who feel a need to enter into the scientific fold. Following Lane (1996, p. 364): 'it has now become possible to qualify as a scientist without being a positivist'. In short, scientific realism offers a new universal approach – one that can straddle the natural and social sciences as well as the naturalist and constructivist traditions. It is a great synthesis of the two main methodological traditions in contemporary science, as described above.

We are leery of such ambitions. By contrast, we wish to encourage students to be sensitive to the ontological and methodological priors of social scientists, and to become more conscious and aware of how these priors affect our work (and how it should be evaluated). In short, we are sceptical of universal narratives. We do not proselytize for any given methodological position, or claim that one position provides better answers to all of life's difficult questions. Ours is a call for methodological pluralism, not methodological conformity.

Chapter Outline and Logic

This book aims to provide an approachable introduction to the main methodologies and methods employed in the social sciences. In contrast to existing methods textbooks, which aim to provide cookbook-like sketches of particular methods under a single methodological rubric,

we aim to survey the broad horizons of contemporary social science research. To do this, we employ a simple, symmetrical outline that allows students to compare and contrast the way in which methods are employed in different methodological contexts.

As a result, our discussion of applied methods is necessarily brief. We encourage students to delve deeper into particular methods once it is determined that a given method is appropriate for the question at hand. We offer a broad survey or overview of the methods available, so that students can find their way more easily through the sometimes dense methods terrain.

The body of the book is divided into two methodological alternatives: one naturalist, the other constructivist. The ontological and epistemological backgrounds to each methodology are presented as an introductory chapter for each section. Thus, Chapter 2 provides an introduction to the naturalist methodology, while Chapter 8 provides an introduction to the constructivist methodology. Because of the material covered in these two chapters, they are necessarily denser than the others. For this reason, we ask for the reader's indulgence and patience when reading them. We believe that this investment of time and energy will pay off when we begin the methods chapters that follow.

By organizing our presentation in terms of two methodological alternatives, we do not intend to suggest that students and authors cannot (or should not) swap epistemological and ontological positions. We are simply proposing two ideal types for the purpose of clarifying different ontological and epistemological approaches (and their relationship to methods). Also, we think that a simplified (two-pronged) approach to methodology provides some pedagogic utility in that it can be used to deliver a relatively symmetrical depiction of the methods available to social scientists. In this way, we hope that the student will find it easier to remember the various ways in which methods are applied under different methodological contexts. In particular, we argue that each methodology appears to have its own hierarchy, or pantheon, of methods.

This hierarchy is clear (and most explicit) when we discuss the naturalist methodology. From this naturalist perspective, the scholar expects to find natural patterns in the world, and careful applications of methods are used to uncover these patterns. This ontology lends itself to an empiricist epistemology, where the collection of empirical evidence is used to persuade and predict.

From this point of departure, naturalists have developed a clear hierarchy of methods. At the top sits the experimental method. This is the ideal method for naturalist explanations because of its ability to control and order causal and temporal relationships. When the experimental method is not a realistic alternative, then naturalist social scientists prefer statistical approaches. Below statistical approaches lies the third-best alternative (when there are too few observations to run reliable statistical queries): small-N comparative approaches. Finally, at the bottom of the naturalist's hierarchy of methods lie case studies, interviews and historical approaches. Social scientists with a naturalist inclination are expected to employ these narration-based methods only when faced with a paucity of data or relative comparisons.

In contrast, constructivist scholars see the world of study as being socially constructed, so they do not expect to see objective (and verifiable) patterns of social phenomena existing naturally in the social world. For the constructivist, motivations and presuppositions play a central role in accessing this world, and the objective of social study is to interpret and understand, not to predict. As a result, the constructivist can draw from a much broader epistemological stable.

Given these ontological and epistemological starting points, we should not be surprised to find that constructivists have little faith, and find little utility, in the naturalist's hierarchy of methods. They advocate an alternative hierarchy, a flatter and less clear ranking than that of the naturalists – but a hierarchy none the less. This hierarchy reflects less a ranking of approaches in terms of their ability to access the truth, and more a hierarchy in terms of the popularity of the given approach/method. As constructivist scholars depend on maintaining the 'constitutive' context of a given phenomenon, they abhor methods that manipulate, dissect or reconstitute the setting in which relevant 'data' are embedded. Given this point of departure, narrative approaches such as discourse analysis and process tracing are the constructivist's methods of choice. These types of narrative approaches allow constructivists to dwell on the particulars and on the contexts that provide them with understanding and insight.

This is not to suggest that constructivists do not rely on comparative methods. Indeed, comparisons are as important to constructivists as they are to naturalists. After all, comparisons play a central (if often implicit) part in the hermeneutic tradition. But constructivists use comparisons in a radically different way. Rather than trying to uncover nature's underlying patterns, constructivists use comparisons to develop associations which can leverage our understanding over particular events, or to understand the reasons why we see the patterns that attract our analytical attention.

These opposing hierarchies are used to structure our presentation of the most common methods used in the social sciences today. Thus, after an introduction to the philosophy of naturalist social science in Chapter 2, we use the subsequent chapters to introduce the hierarchy of naturalist methods in the following preferred order: at the top is experimental (Chapter 3); followed by statistical (Chapter 4); then comparative (Chapter 5); and finally, in Chapter 6, case-study methods.

At this point we reach the book's fulcrum, in Chapter 7, where we pause to examine the problems of naturalism and the utility of an alternative methodological approach. In particular, we question the assumption that methodological holism serves the social sciences – in other words, the notion that there is a Real World beyond our senses, and that observation and language can be used to depict that Real World objectively. These shortcomings are used to introduce different methodological approaches to social phenomena – one of which is constructivist in nature.

The second part of the book describes the constructivist approach. Chapter 8 mimics Chapter 2, in that it provides the ontological and epistemological counterweights to the mainstream (naturalist) tradition. From the constructivist perspective, the human world is seen as being socially constructed; motivations and presuppositions play a central role in accessing this world; and the objective of social science is to interpret and explain the nature of those social patterns, rather than to predict outcomes. As a result, the subsequent chapters illustrate the utility and application of different methods, in the context of constructivism. Thus we begin with an introduction to narrative methods (Chapter 9), and follow this with a sketch of comparative (Chapter 10), statistical (Chapter 11) and experimental methods (Chapter 12). In this second part of the book we see how constructivists can employ identical methods to those used by naturalists, but how these methods are prioritized differently and used in different ways, toward different ends.

By organizing the book in this symmetrical fashion we are emphasizing the utility of *balancing* these two approaches. We begin with the naturalist approach because it is the dominant and the most familiar methodological approach in contemporary social science. And by concluding with a description of constructivist approaches we are not suggesting that the latter supersedes the former. Indeed, we think that the best scholarship in social science draws from both methodological sources: good work in the naturalist tradition is sensitive to constructivist concerns, and vice versa. We cannot emphasize this enough: our aim is to encourage methodological pluralism, not to advocate one approach at the expense of the other.

For fear of encouraging a new cleavage in social science, and with the aim of emphasizing the complementary nature of these two methodological approaches, our concluding chapter emphasizes the utility of building bridges that can link naturalist and constructivist approaches.

Given this design, it occurs to us that there are several different ways that the reader might approach the text. We have designed the book in a way that emphasizes the two distinct methodological traditions, so that each particular method can be understood in light of an author's particular methodological commitments. But it is entirely possible for the reader to jump around the book by comparing approaches on a particular method. For example, those with an interest in philosophy of science issues might begin by reading (and comparing) Chapters 2 and 8. Alternatively, those readers who have a soft spot for comparative approaches might begin by reading and comparing Chapters 5 and 10. In short, we hope that the book's logic and symmetry make this sort of individual reading both accessible and useful.

Recommended Further Reading

As mentioned in the text, readers might compare and contrast Edward O. Wilson's (2003) *Consilience* and Bent Flyvbjerg's (2001) *Making Social Science Matters* to fathom the remarkable variance that separates naturalist and constructivist approaches to social science. The founts from which much critical realism flow are Roy Bhaskar's (1997 [1975]) *A Realist Theory of Science* and his (1998 [1979]) *The Possibility of Naturalism*; and a thorough introduction to critical realism can be found in Margaret Archer *et al.*'s (1998) *Critical Realism: Essential Readings*. The practicing social scientist may find it easier to access scientific realism by way of Andrew Sayer's (2000) *Realism and Social Science*, or through its application – as in, for example, David Marsh *et al.* (1999) *Postwar British Politics in Perspective*. For those who would like to learn more about the philosophical foundations of contemporary social science, Patrick Baert's (2005) *Philosophy of the Social Sciences* is highly recommended.

Chapter 2

The Naturalist Philosophy of Science

The origins of modern science can be traced back to the early spring of 1610, to a slim book entitled *The Starry Messenger*. Today's readers would have to search long and hard for excitement or provocation in this book, as it largely describes the night sky. Yet, in the early 1600s, *The Starry Messenger* was capable of triggering condemnations, angry reactions and even calls for its author to be burned at the stake.

The author was Galileo Galilei (1564–1642). His controversial observations were enhanced by a new instrument, the telescope, which enabled him to describe and draw pictures of configurations in the night sky. The telescope also enabled Galileo to see things that traditional science had not prepared him to expect – including mountains on the moon (which orthodox churchmen considered impossible), and three moons or satellites that circled Jupiter in a steady orbit. The latter was not only impossible, it was clearly in violation of Church doctrine, which held that the Earth was handmade by God and placed at the centre of an equally divinely crafted universe. The Earth was encased in eight perfectly circular crystal spheres, to which the sun, the moon, the planets and the stars were attached (and pushed across the sky by angels). If moons orbited Jupiter, as Galileo said, this would break the crystal sphere to which Jupiter was attached.

The Church was in a quandary over what to do with the book (and its author). In a sense, Galileo made things easier for them by blatantly stating that any discrepancy between his observations and those of Aristotle must be the result of Aristotle's shortcomings. As Church scholarship rested almost entirely on Aristotle's authority, Galileo's fumblings could not be ignored. If Aristotle had been wrong, then a thousand years of established knowledge would tumble down around the ears of scholars everywhere.

The Starry Messenger is a milestone in the history of science. It is often seen as the first true application of the scientific method – of a process that involves systematic observation, scrupulous note taking of things and patterns observed, and thoughtful efforts to make sense of it all. The book represents a different approach to knowledge than that advocated by Church scholars. According to Galileo, the traditional approach did not further the cause of knowledge; rather, it inhibited new discoveries. The traditional approach to knowledge was weighed down by excessive reliance on established authorities, and it hampered human beings' observation of nature. In Galileo's view, only free and independent scholars could observe nature impartially and gain new insights about its regularities.

This view gained Galileo many opponents among clerics, who argued that he was rejecting tradition and authority – including the authority of God and the Church. The situation was untenable and the match uneven: in one corner was Galileo; and in the other, Aristotle, the Church, God and 2,000 years of accumulated knowledge. The situation was also dangerous; because Galileo persisted in his observations, his speculations and his disrespectful comments, the Inquisition charged him with heresy in 1633. Faced with a possible death sentence, Galileo agreed that cosmic questions were not 'legitimate problems of science' and publicly withdrew some of his claims. The Church, for its part, commuted his sentence to life imprisonment.

About the same time, Galileo's fellow stargazer, Johannes Kepler (1571–1630), found himself in a similar situation. He too broke with traditional science and struck out on his own. Like Galileo, he spent years observing planets and stars, and accumulated vast piles of notes (both his and those of the great Danish astronomer, Tycho Brahe). After a long and careful analysis of these notes, Kepler also drew conclusions that clashed with the established knowledge of the Church. First, he suggested that Aristotle was wrong (Aristotle had claimed that each planet travels in a perfect circle around the earth, whereas Kepler proposed that they orbit the sun in an elliptical pattern and that the speed of each planet is not uniform throughout its orbit; rather, planets travel faster when their orbits are closest to the sun). Kepler expressed this orbit, including its curious variance, in the precise language of mathematics.

Isaac Newton (1642–1727) would later draw on the observations of both Galileo and Kepler to take the next great leap in human knowledge. He identified regularities in the sky and on Earth, and argued that bodies attract each other according to a constant principle. Newton's supreme achievement was to bring Galileo and Kepler together, and to demonstrate that Galileo's laws of motion on Earth and Kepler's law of planetary motion in the heavens were, in fact, two aspects of the same great regularity. Newton's *Mathematical Principles of Natural Philosophy* (1968 [1687]) explained persuasively why the universe behaved according to clockwork-precise patterns of perfectly repeated movements in space.

The Birth of the Philosophy of Science

The above sketches, from the history of astronomy, provide a common story of the birth of modern science. It is a story of individual risk-takers who relied on empirical observation to combat the myths of the past and liberate themselves from the interpretive contexts of their time. Related to this story is another, which provides us with the epistemological support needed to understand Galileo's, Kepler's and Newton's success. Sir Francis Bacon (1561–1626) – lawyer, politician and scientist – played a central part in this story.

Galileo had openly criticized Aristotle's *Physica*, thereby triggering a controversy with the Church that produced a new methodology – a controversy that very nearly cost him his life. Bacon objected to another of Aristotle's great books, the *Organon*, and ignited a similar revolution in ontology and epistemology. In the same way that Galileo's work was followed up by astronomers such as Kepler and Newton, Bacon's work was followed up by philosophers of science – men like John Locke and David Hume.

Galileo and Bacon were both part of a critical movement that contributed to the secularization of human knowledge about the world. They both questioned traditional ways of knowing. They both challenged the Church-sanctioned idea that God had granted man 'natural reason', which could be accessed to understand the world, and that this approach alone could secure reliable knowledge. And they both found themselves in conflict with the Established Church authorities – though Galileo suffered more seriously than did Bacon.

Francis Bacon and the Method of Induction

By profession, Francis Bacon was a lawyer and a politician – eventually becoming Lord Chancellor under King James I of England. By inclination, he was a tinkering jack-of-all-trades. One might even say that Bacon was more of a handyman than a scientist – indeed, he had more respect for handymen than for scientists, whom he referred to as 'spiders who make cobwebs out of their own substance' (Bacon, 1994 [1620], p. 105).

Bacon admired the skills of craftsmen. By watching them work, he came to grasp a new way of obtaining knowledge about the world. In contrast to the sterile debates of Aristotelian philosophers of science, Bacon argued that the practical methods of craftsmen could generate new knowledge, informed by nature. When he sat down to write a book to introduce his new method, he began with a head-on attack on Aristotle's method (and with it, the method of Church scientists). His ambition was to write a book that superseded Aristotle's authoritative *Organon*; so Bacon called his book *Novum Organum* (1994 [1620]).

Novum Organum introduced an approach to acquiring knowledge that differed greatly from the methods used by traditional scientists. Traditional scientists followed Aristotle's advice and started with a general proposition. They began with generally accepted truths or axioms and would use these to illuminate particular observations. By doing this, Bacon explained disparagingly, traditional scientists were unable to produce new knowledge; the approach simply drafted observations to serve already established truths. For science to proceed, Bacon continued, it was necessary to follow a different procedure – one that combined deduction and induction; a procedure that was a matter of routine among skilled craftsmen.

Unlike the scientists of the day, craftsmen did not start with general truths. They began by assessing the particular object or situation at hand. Craftsmen were employed to produce different things under different circumstances – a carpenter was ordered to fix a roof by one patron, build a table by another, and repair a hayloft or a stable by a third. This variety of tasks necessitated an active, improvising and experimental approach, harnessing inductive procedures. From his observation of craftsmen in action, Bacon argued that the scientist must begin with systematic observation. He must then build his argument from a large number of single observations toward more and more general truths. The craftsman and the scientist both begin with the particular and '[call] forth axioms from the senses and particulars by a gradual and continuous ascent, to arrive at the most general axioms last of all' (Bacon, 1994, p. 47f).

This active way of engaging the objects of the world stood in stark contrast to the passive contemplation of the Church philosophers, who, in their observations of objects, plants and animals, too readily relied on preconceived notions and on the facts that supported them. The philosopher begins at the wrong end, Bacon charged; he begins with axioms or general truths, and seeks to understand the particulars in light of them. These different approaches are described in Figure 2.1.

Bacon is seconding a critical point that Galileo had already hurled at traditional Church scientists: their main problem was that they engaged in deductive exercises based on authoritative texts. While Bacon

Figure 2.1 *Classic deduction and induction*

Deduction builds on true and accepted claims (axioms). Deduction starts with general truths and proceeds through established rules of reasoning toward explanations of single events. As such it can be understood as a top-down approach, where lofty, more general, theories guide the empirical studies below.

Induction builds on sensory observations (sight, smell, touch and so on). Induction starts with empirical particulars on the ground, and generates more general theories at a higher level. Consequently, induction can be seen as a bottom-up approach.

preferred to take his clues from craftsmen, he recognized that they had shortcomings of their own. One was that they had no texts. The experience of craftsmen was handed down orally and practically from master to apprentice. The substantial knowledge and the pragmatic methods of a craft were kept alive as praxis, but they remained largely unrecorded. For Bacon, hope lay in combining experience with record-keeping: when 'experience has learned to read and write, better things may be hoped' (Bacon, in Mason, 1962, p. 142). Craftsmen, in other words, must learn to record their observations. Their notes could then be checked and tested in a way that would provide an empirical basis from which new knowledge could be generated.

When Bacon explained this procedure, he justified it by two important claims: (i) only direct observations supply us with statements about the world; and (ii) true knowledge is derived from observation statements. In other words, Bacon not only rejected the deductive method of the old philosophers; he protested the faith in God-given insights and made himself the champion of sense perception. In effect (if a little unjustly), Bacon became history's spokesman for the inductive method.

The old logic of deduction relied on reason alone and was applied by philosophers who followed 'the way of the spider'. No new knowledge could come from such men, who endlessly 'spin webs out of themselves'. Against this method of the spider, Bacon contrasted the logic of induction – the logic of craftsmen who relied on trials and experiments and their faculties of observation. Craftsmen followed 'the way of the ant' by collecting material from the world and using it to construct larger edifices. In this way, they could produce new knowledge. This was a great advantage, but it had to be tempered by the realization that this new knowledge was not necessarily true.

Despite Galileo and Bacon agreeing that systematic observation of the world could produce new knowledge, Bacon's argument had a darker edge to it. He saw that the human senses could not always be trusted, and that the world might not always be as it appears. An observer could not trust his senses blindly; he must fortify them with 'common sense' and reason. In the end, then, Bacon recommended that science could not rely exclusively on either the 'way of the spider' or the 'way of the ant'. Science must rely on both – 'the middle way':

> The middle way is that of the bee, which gathers its material from the flowers of the garden and field, but then transforms and digests it by a power of its own. And the true business of philosophy is much the same, for it does not rely only or chiefly on the powers of the mind. Nor does it store the material supplied by natural history and practical experiments untouched in its memory, but lays it up in the

> understanding changed and refined. Thus from a closer and purer alliance of the two faculties – the experimental and the rational, such as has never yet been made – we have good reason for hope. (Bacon, 1994, p. 105)

Locke, Hume and the Modern Philosophy of Knowledge

At the end of the seventeenth century, John Locke (1632–1704) built on Bacon's empiricist foundations in *An Essay Concerning Human Understanding* (Locke, 1984 [1690]). Locke set out to discuss the 'extent of *human knowledge*, together with the grounds and degrees of *belief*, *opinion* and *assent*' (p. 63, italics in original). He repeats Bacon's argument that knowledge should rely on sense perception, and defends it in a way that has since played a decisive role in modern science. Locke's defence had an enormous influence on subsequent British philosophy and has furnished the modern notion of empiricism with its basic claim that all knowledge is empirical in origin.

Locke did not deny the Christian axiom that humans are God's creation, fashioned in God's image. However, he did deny the medieval notion that God had endowed human beings with innate (or *a priori*) ideas. For Locke, a human being was born with a mind that resembles a blank slate (a *tabula rasa*): there is no such thing as *a priori* knowledge. For this reason, knowledge of the world cannot be gained by turning our attention inward in an introspective search for a 'natural reason', divinely endowed by an omniscient God. For Locke, all knowledge is a posteriori – in other words, it can only be derived from sense experience. Knowledge enters the human mind through the organs of sense in the form of sense impressions; these are stored in the memory as single ideas and may be retrieved and recombined by the imagination.

Even fanciful ideas that have no correspondence to the Real World – a unicorn, for example – are arrived at through simple sense perceptions. Thus, we perceive simple phenomena, such as a horse and a rhinoceros, and we store these in our mind in the forms of simple ideas. By rearranging and recombining these simple ideas, the mind can form new, more complex ideas. Out of the single idea of a horse and the single idea of a rhinoceros, the mind can produce the complex idea of a unicorn.

In order to gain knowledge about the world, then, we must first gain impressions about the world – through our senses – and store these in our minds. We can then process these sense impressions in systematic ways, according to established rules of logic, 'justified by a sufficient and wary induction of particulars' (Locke, 2004, §13). Note how Locke follows Bacon in being aware of the potential biases inherent in inductive approaches.

Locke's concrete and commonsensical style, his practical tone and his warnings against unverifiable speculations combined to secure him a wide circle of readers and followers. As a result, his book was immensely influential. Indeed, when David Hume (1711–76) resolved to write an epistemological essay of his own half a century later, he could confidently assume that his audience was already familiar with Locke's argument.

Hume begins his *An Inquiry Concerning Human Understanding* (1983 [1748]) where Locke stopped. Like Locke, Hume agreed that all human knowledge comes from sense experience, and that the mind preserves sense impressions in the form of simple ideas. But Hume refined Locke's argument by probing the two faculties of the human mind (memory and imagination) in greater detail. Through this discussion, Hume refined some of Bacon's more troubling insights about the fallibility of the human senses and things not being what they seem. From this scepticism Hume fashioned one of the most consequential arguments in modern epistemology: he began to doubt the universal validity of induction. This led him to wonder whether causal analysis was in fact possible at all – a doubt that still shakes the very foundations of modern philosophy of science.

Hume the Empiricist: The Philosophy of Human Understanding

Like Locke, Hume claimed that we use *memory* to preserve and arrange the simple ideas we have stored in our minds. In fact, he held that we preserve these ideas in the exact order in which they entered the mind. He then suggested that we use *imagination* to rearrange and recombine these simple ideas into complex ones. This delegation of responsibilities within the brain raises an important point: since ideas are sequenced by the order they entered the mind, simple ideas cannot be rearranged in any desired manner. In other words, the mind does not function in a random way: human imagination arranges ideas in ordered clusters or sequences. Thus Hume believed that ideas are strung together by a principle of association or attraction. He argued that the identification of associations is common to all scientific endeavours. His discussion of the relationship between association and causation contains some of the most basic insights of modern philosophy of science. And the implications he drew sparked a debate about cause and effect that continues undiminished today.

Whenever we see two events that appear together, we immediately begin to discuss cause and effect, argued Hume. This, however, raises a dilemma for empiricists, as causality cannot actually be perceived. We can observe that A and B occur concomitantly, or simultaneously; but we cannot observe causality itself. It is our imagination, not our perception, that provides the actual (causal) link between A and B. Hume held that our imagination does this because it is our custom or habit to link events, and because the imaginative properties of our minds are capable of providing logical explanations for why B must occur in the aftermath of A.

At the core of Hume's argument lies a psychological claim: namely, that human beings are pattern-finding animals, and the human mind is capable of devising theories, which it then imposes on the world (Popper, 1989, pp. 42ff). At this point, Hume's training as a sceptic comes in with full force.

Hume the Sceptic I: Doubting the Inductive Road to Knowledge

Hume sympathized with Bacon's two claims: (i) that observations supply us with statements about the world; and (ii) that scientific knowledge could be derived from such observation statements. He also shared Bacon's doubts about human beings' frail faculties of observation. The more he turned these doubts around in his mind, the more sceptical he became of the way that scientists often used observation statements as springboards for bold and unwarranted conclusions. He concluded that no number of observation statements, be it ever so large, can produce reliable generalizations. Whereas Bacon had considered general statements to be the reliable children of reason, Hume revealed them as bastards of custom and imagination.

Human knowledge is a flimsy phenomenon, and because of its flimsiness, Hume argued, science needs to treat causal claims with great caution. Strictly speaking, science should not try to explain facts; it should be content with describing them and demonstrating their regular appearance. The reason is obvious: patterns and regularities can be observed, while causality cannot! We can observe facts. We can observe that first one fact (A) appears and that another fact (B) then appears. We can observe that the two facts always appear together. But our senses cannot observe any mechanism by which one fact causes the other. Our imagination, however, can easily enough conjure up some such mechanism, and our reason can make a causal connection credible. Following Hume, we must recognize that causal explanations are nothing more than imaginary. We make them up.

This is not to suggest that all observation is relative: for the naturalist, a Real World does exist. Rather, our perception of this Real World is held together by imaginary notions. John Passmore (1987) provides an example of how we can understand Hume's argument when he asks us to imagine a baby – an exceptionally bright child – whose parents have always given him soft cotton toys to play with. The baby has often dropped these toys out of his crib and they have fallen to the floor with a soft thud. One day his uncle comes to visit and gives the baby a rubber ball. The baby smells it, tastes it, feels it and then drops it out of his crib. Instead of landing softly on the floor, the ball bounces around. The baby is surprised and confused, and begins to cry. For all his careful investigation, the baby's experience with toys is limited to those that land softly on the floor when dropped; he has no possible way of predicting the bouncing behaviour of the ball. This example serves to illustrate Hume's first point: that just by examining a thing, we can never tell what effects it might produce.

To illustrate Hume's second point, Passmore changes the parallax from the baby to the uncle. When he sees the baby drop the ball, the uncle expects the ball to bounce. If you ask him what caused the ball to bounce, the uncle might reply: 'Balls bounce. Rubber balls have the power to bounce when tossed. My nephew tossed the ball and caused it to bounce.' Asked to elaborate, the uncle might say: 'There is a necessary connection between a ball's being dropped and its bouncing. ...' It is at this point that Hume asks his profound question:

> What experience has the uncle had that the child lacks? The uncle makes use of such general concepts as 'cause', 'power', 'necessary connection'. If these are not just empty words, they must somehow refer back to experience. Well, then, what, in the present case, is his experience? How does the uncle's experience differ from his nephew's experience? (Passmore, 1987, p. 147)

Habit is the only difference Hume can find. The uncle has different expectations than the child because the uncle has observed, in many different contexts and over a large number of cases, that rubber balls bounce when dropped. His expectations are hardly conscious, but are derived from custom or habit. The baby is too young to have had such experience.

This explanation seems to answer the question as to why the uncle has different expectations than the child. But it raises another, much more serious, problem: it implies that these habits of the mind are not trustworthy because they do not produce certain knowledge. Habits are merely unthinking products of our minds. If induction is the foundation of science (as, for example, Bacon insisted), then science (Hume implies) rests on a foundation whose stability and carrying capacity are impossible to demonstrate. This implication has baffled philosophers of science ever since. Indeed, throughout the nineteenth century and the first half of the twentieth, it may be fair to say that Hume's argument was the prime skeleton in the naturalist's closet.

Hume the Sceptic II: Ground Rules of Science

If induction cannot produce certain knowledge, and causal explanations are nothing more than habits, justified by human beings' fertile imaginations, how in the world can we perform science? Hume's answer was: very cautiously. Scientists should lower their ambitions. They should not yield to the temptation of trying to explain too much. They should refrain from imposing causal explanations on the world. Science should, in fact, avoid causal claims completely; it should restrict itself to identifying and observing regularities in the world. In short, scientists should focus on correlations. They should identify and map factual correlations – that is, correlations among facts that are directly observable by the human senses.

To explain the realm of science more carefully, Hume drew a basic distinction between two types of knowledge: that based on *facts* (empirical knowledge) and that based on *values* (normative knowledge). *Empirical knowledge* is based on fact, and is the foundation of science. It consists of knowledge about the observable world. It is accessible to all human beings via sensory perception. And all sensible people are in agreement about the basic properties of this observable world. This is the core element of what we have called the naturalist methodology: a Real World characterized by natural patterns that are observable to us (in other words, that we can experience). Over time, humankind has collected much common knowledge about the world from a vast number of simple sense impressions. In contrast, *normative knowledge* is a type of knowledge based on values and beliefs. It can provide no basis for science, because we can say nothing certain about it. It is subjective, since different individuals tend to entertain varying values and beliefs.

This distinction between facts and values – between empirical knowledge and normative knowledge – remains important in naturalist science. It implies that science is based on facts, not on norms. This should not be interpreted to suggest that Hume felt that values and beliefs were unimportant or unworthy of scholarly investigation. His simple point was that they fall outside the purview of science proper. Science can help us to answer questions formulated about empirical events, but it cannot settle normative disputes – these must be left to theologians and philosophers (who, after 2,000 years of debate, still appear to be far from in agreement).

All members of the community of naturalist science will, when push comes to shove, agree with Hume's proposition that science must be based on facts and not on values. Still, few of them would choose to formulate this claim in the draconian terms with which Hume concluded his *An Inquiry Concerning Human Understanding*. If we should reassess human knowledge, if we should:

> run over libraries, persuaded by these principles, what havoc must we make? If we take in our hand any volume – of divinity or school metaphysics, for instance – let us ask, *Does it contain any abstract reasoning concerning quantity or number?* No. *Does it contain any experimental reasoning concerning matter of fact and existence?* No. Commit it then to the flames, for it can contain nothing but sophistry and illusion. (Hume, 1983 [1748], p. 173)

The Basic Assumptions of the Naturalist Methodology

Francis Bacon, John Locke and David Hume provide us with the basic framework for a modern philosophy of scientific knowledge. In their work, subsequent thinkers have found support for the claims that the world is real; that it consists of independent particulars; that these particular components interact in regular and patterned ways; and that human beings can experience these interactions by way of sense perception. To the basic conceptual frame built by Bacon, Locke and Hume, modern naturalists have added planks and boards of their own. Their additions, however, have hardly altered the basic design of these Founding Fathers, whose main contributions are listed in Figure 2.2.

For example, subsequent naturalists have interpreted Locke and Hume to mean that there *is* a Real World 'out there' – a Real World that exists independently of our senses. This world exists whether human beings are there to observe it (or not); and it may be experienced through systematic sense perception. Such experience and observations can, in turn, be communicated from one naturalist to the next through the reliable medium of language – that is, through clear and precise observation statements. From this, naturalists can access a clear and simple definition of 'truth': a statement that accurately corresponds to a state of affairs in the Real World. This is the famous 'correspondence theory' of truth, which is today often associated with Karl Popper (1994): a 'theory or a statement is true, if what it says corresponds to reality' (p. 5).

Figure 2.2 *Some founding fathers of the naturalist methodology and their main contributions*

Galileo Galilei	1565–1642	*The Starry Messenger* [1610]
Francis Bacon	1561–1626	*Novum Organum* [1620]
John Locke	1632–1704	*An Essay Concerning Human Understanding* [1690]
David Hume	1711–1776	*An Inquiry Concerning Human Understanding* [1748]

Subsequent naturalists have found in Hume an impetus to uncover the regularities of nature and document them as accumulated associations. John Stuart Mill's (2002 [1891]) magisterial *A System of Logic* is typical in this regard. For Mill (1806–73), science involves two propositions. First, knowledge about the laws of nature is acquired through the identification of associations (or, in more modern terms, variable correlations). Second, human knowledge grows over time through the accumulation of observation statements, of tested and true correlations, and of logical argument. New scholars rely on the disseminated texts of their predecessors, using the arguments of their elders as vantage points for their own. In this way, knowledge grows through the generations.

Finally, naturalists have relied on this empiricist epistemology to define a 'theory' as a set of (verified) correlations, logically or systematically related to each other. In the naturalist tradition, 'theory' hinges on a statement which says that one phenomenon (or one class of phenomena) is connected in a certain way with another phenomenon (or class of phenomena). For the naturalist, a theory is a map of associations. Galileo's observation statement that the planets revolve around the sun would be the core of his theory of planetary orbits.

On Doubt and Reductionism: The Cartesian Revolution

The empiricist philosophy that evolved in seventeenth- and eighteenth-century England had parallels elsewhere. In France, for example, René Descartes (1596–1650) shared the basic attitudes of the empiricists of his age. He was an opponent of traditional, scholastic philosophy, and shared with Galileo and Bacon a number of attitudes and new insights about the world and how we can come to know it. Indeed, Descartes pushed to its extreme the idea that the world is a material reality; that human observers can gain knowledge about the world through their senses; and that knowledge can be spread by communicating it to others in crisp and clear language. His *Meditations on the First Philosophy* (Descartes, 1993 [1641]) is an excellent example of this. Not only does he set his own observations before the reader, but he also tries to make the reader engage with the facts. He wants his readers to do more than just passively absorb the information he provides: he cleverly engages them to ensure they understand the importance of the question and then to follow the twists and turns of his argument.

Descartes did not question the key empiricist claim that sense experience is the basic component in knowledge acquisition. Indeed, he sought to capture it more accurately by arguing that sense experience belonged to a world of its own – an outer world of extension that could be captured in geometrical terms. This world of the senses was separate from the inner world of the mind. Descartes elaborated on this distinction between an observable world of extended matter on the one hand and an invisible world of spirits on the other, and these elaborations have gone down in the history of philosophy as Descartes' distinction between body and mind, or the doctrine of Cartesian dualism (Descartes 1993 [1641]). It created a great deal of trouble for Descartes and his adherents, because they knew it was impossible to rely on sense experience alone. Descartes shared Bacon's concern that the human senses are not trustworthy; they must be harnessed by Reason. In fact, the famous 'Cartesian method' is not far removed from Bacon's 'way of the bee'. The difference between the two is often exaggerated (it is commonly claimed that whereas Bacon stressed the importance of induction, Descartes emphasized the importance of deduction); it is important to note that theirs is largely a difference of emphasis – both of them found a place for inductive as well as deductive procedures. Both Descartes and Bacon claimed that the business of science was to produce general statements, cultivate main features and produce simple models of the world.

Descartes, like his contemporaries Galileo and Bacon, assumed that the world ultimately *was* simple. If one could penetrate below the blooming, buzzing complexity of the superficial world, one would find the serene and simple mechanisms of a streamlined design. To arrive at this world, Descartes recommended two epistemological principles: systematic doubt, and reductionism.

The most famous explication of systematic doubt is set out in his *Meditations*. Here, Descartes begins by asking what it is possible to know. But before he begins to build his argument about human knowledge, he argues that we must first cleanse our mind of all former beliefs, because many of these are bound to be false. This claim created an enormous stir in scholastic circles, and members of the Church accused Descartes of wanting to destroy truths, morals and decency. (Sound familiar?)

Descartes responded to the charges with an analogy: he who is worried about rotten apples in a barrel will be well advised to tip out all the apples and then replace each one carefully, inspecting every single apple for damage and rot. Only when he is certain that an apple is sound should he put it back in the barrel. If he makes a single mistake, the entire barrel may be spoiled. Descartes' point is that all claims should be treated as if they were false. We should only add a claim to our stock of knowledge if we are certain that it is true; if we are in the slightest doubt about a claim's veracity, we should reject it.

In 1637, Descartes published his famous book on the scientific method: *Discourse on Methods for Conducting Reason and Seeking Truth in the Sciences* (1973 [1637]). Here he expanded on his second epistemological principle of science: reductionism. This principle holds that you should always build your investigation from the bottom up, beginning with propositions that you know to be absolutely true. Descartes' principle of reductionism is intimately connected to his principle of systematic doubt: begin your investigations into a subject by dividing every extant argument into its component propositions. Ask of each and every proposition: how do I know that this is true? Then, reject every proposition that you cannot verify without the shadow of a doubt – as if they were bad apples. By this process, in due time, you will have reduced the number of propositions about your subject to a few, true, core claims. These few, indubitably certain components will serve as the solid foundation upon which you can then build an argument.

How, precisely, do you build this argument? Descartes summarized his method with three pieces of advice. We have already learned of the first: divide each problem into its smaller, constituent parts. His second piece of advice was to proceed in an orderly and logical way: 'always beginning with the simplest objects, those most apt to be known, and ascending little by little, in steps as it were, to the knowledge of the most complex'. And third, learn from geometry! Look at how the geometricians proceed from a few indubitable axioms and build their arguments step by step, with clear logic and discipline. Observe, writes Descartes (1973 [1637], p. 20; our translation), the 'chains of perfectly simple and easy reasonings by means of which geometricians are accustomed to carry out their most difficult demonstrations', and deduce one thing from another.

Descartes believed that his method of systematic doubt – whose procedures are so well captured by his apple barrel analogy – was the best way to clear the cluttered growth of everyday sense perception and lay bare the simple, basic structures of the Real World underneath. He also believed that this process could be aided by the logical procedures of geometry and algebra. His principles of systematic doubt, reductionism and cool analysis are still basic rules of thumb in the naturalist methodology. Not only do they increase the certainty of an argument, but they also help to make it lean and efficient in form. By eliminating all dubious assumptions, a scientist is left with a simple set of axioms upon which a rational argument can rest logically. It is, in other words, possible to cultivate simplified versions of the world. Indeed, it is not merely possible; it is the only proper way. The only way to penetrate the complexity of the superficial world (and identify the streamlined design of the universe) is to remove superficial details and unnecessary clutter; to reduce the world to a simplified model of essential principles.

There are clear differences between the English philosophers of science and their continental colleagues. To some, these differences are large enough to warrant different labels: whereas Britain's seventeenth- and eighteenth-century philosophers of knowledge are commonly called *Empiricists*, their French contemporaries are often referred to as *Rationalists*. For us, the parallels between these schools of thought are more striking than their differences. Both schools assumed that the Real World is a material fact. Both assumed that this World is orderly and streamlined. Both argued that scientists have access to this world through sense perception. Descartes, who is often identified as a rationalist par excellence, quarrels with none of these key assumptions. The procedures of 'Cartesian doubt' and 'Cartesian reductionism' were adopted by empiricists everywhere – and developed into potent instruments of modern science. The immense analytical powers they represented were greatly augmented by the addition of mathematical techniques – which Descartes also pioneered, and which subsequent scientists such as Sir Isaac Newton applied with immense success.

In the naturalist tradition, this rationalist legacy is clearly evident in today's rational choice approaches. In effect, Descartes planted an intellectual seed that lay dormant for a century and a half, while remaining fertile all the while. Then, with the protection and sustenance offered by David Ricardo (1772–1823), a deductive approach began to take root. From Ricardo (and the modern study of economics) grew rational choice approaches, which have spread rapidly to neighbouring fields of social science.

Rational choice theorists formulate their argument on the basis of axioms. An axiom is a statement for which no proof is required. Because of this, axioms form an important premise to an argument – but they do not, in themselves, furnish a conclusion. Common axioms in rational choice approaches include perfect rationality, transitivity and non-satiety – axioms that are necessary for deriving inference curves that are convex to the origin.

Upon these axiomatic premises lies the logic imbedded in mathematics. It is these rules of logic that allow the modeller/analyst to deduce consequences. In short, the method involves establishing basic axioms that are either true by definition or 'self-evident', and using deductive logic to derive theorems that are not self-evident. In other words, the main role of deductive approaches is to guarantee consistency. The use of logic, the set of rules that preserve the truth of an argument, guarantees that an argument is consistent.

This deductive arsenal is today employed as part of a mind-numbing (shock and awe!) display of formal models and game-theoretic approaches to social behaviour. At their root, these approaches tap into the underlying patterns inherent to nature, as revealed by reason. Naturalists embrace rationalism as an integral part of their effort to explain the social world; they employ rational arguments in the form of theory. These theories are then used to generate testable hypotheses, which the naturalist subsequently tests on the Real World. But for the naturalist, the real proof still lies in the pudding: the explanation that results must correspond with those measurable patterns that are evident in the world.

In pursuing this rationalist/deductive lead we have gone too far ahead of our story. It is time now to return to our earlier focus on the (empiricist) way in which methods are designed to map out, or guide us through, the patterned social world. To do this, we turn to one of the first scholars who sought to carve out an academic field devoted to the scientific study of human society: Auguste Comte (1798–1857). He called this new field 'sociology'.

Post-Cartesian Developments: From Comte to Vienna

Comte's *Cours de philosophie positive (Course of Positive Philosophy)* (1949 [1830–42]) popularized terms such as 'positive perception' to indicate the type of knowledge that was acceptable for science. For Comte, the social and natural sciences shared two important features: the same epistemological form, and both needed to be freed from metaphysical speculation (read deductive approaches). Toward that end, Comte coined the term 'sociology' to designate the science that would synthesize all positive knowledge about society and guide humanity in its search for the 'good society'.

Comte's sociological method hinged on two arguments: one epistemological, the other historical. His epistemological argument involved two simple claims. The first repeated the basic claim of earlier empiricists: that all scientific knowledge about the Real World flows from empirical observation – from sense perception or, as he called it, from 'positive perception'. Comte's second claim was a radical application of Hume's distinction between fact and value – between empirical and normative knowledge. In particular, Comte held that knowledge which does not originate in positive perception – that is, which is not fact-based and empirical – is not knowledge about the world, and therefore falls outside the purview of science. Comte derived his two claims from observing how research was done in the natural sciences, and he saw a logical continuity between the investigation of natural and social phenomena. Knowledge about the social world, he argued, will also accumulate until it slowly arrives at general statements and fundamental insights.

The second argument that sustained Comte's sociological method elaborates on this notion of slowly accumulating knowledge and involves historical evolution. It held that human thought and science has evolved through various 'ways of knowing'. In particular, he mapped three historical phases. The first was a mystical, theological stage – a primitive phase during which human beings tried to understand the world in religious terms. One of its key characteristics was the notion that the world was created by divine beings. The second phase was metaphysical, when humanity tried to understand the world in abstract terms. Its key notions involved abstract principles and ultimate causes. Finally, knowledge proceeded to a scientific or positive phase. Here the search for ultimate causes is abandoned, and humanity instead tries to establish laws. The only way to search for these laws is through systematic, empirical observation.

Émile Durkheim (1858–1917) fully agreed that the purpose of social science was to search for laws in the social world through systematic, empirical observation. He carried Comte's project into the twentieth century with respect to the need to develop more rigorous, empirically-grounded scientific methods. In addition, Durkheim agreed that society is a part of nature, and that a science of society has to be based on the same logical principles as those that characterize the natural sciences. Durkheim – like Comte – longed to cut social science free from the metaphysical tendencies that dominated social thought in the nineteenth century. Toward that end, Durkheim went to great lengths to encourage sociologists to move away from the study of concepts and to focus on the study of things – most particularly, 'social facts'.

Durkheim did this most evidently in his *The Rules of Sociological Method and Selected Texts on Sociology and Its Method* (1964 [1895]). In this he lamented the lack of discussion among sociologists about the proper approach to social phenomena. To address this problem, he suggested that we must start the journey anew, and used the first two chapters of his book to trace these initial steps.

In particular, Durkheim argued that '[t]he first and most basic rule is: *Consider social facts as things*' (1964 [1895], p. 14, emphasis in original). Social scientists need to establish social facts: things that are independent of, and constrain, individuals. For Durkheim, '[a] social fact is to be recognized by the power of external coercion which it exercises or is capable of exercising over individuals' (Durkheim, 1964 [1895], p. 10). Defined in this way, social facts are not reducible to other disciplines – for example, they are not biological or psychological facts; they are socially constructed and collectively maintained constraints (for example, norms, rules, laws, economic organizations, customs and so on). On this premise Durkheim made the case for sociology as an autonomous social science.

For sociology to be a science, Durkheim argues, it has to start with sense perception. To this he adds that senses are not always trustworthy. In doing so, he begins by merely retracing the thoughts of Bacon and Hume on the problems of perception. Then, however, he adds a new concern: the epistemological problems that haunt the natural sciences are multiplied in the social sciences. Social facts, Durkheim continues, are more difficult to observe than natural facts. Social facts do not just appear to our senses; on the contrary, what appears directly to our senses is often illusory or mistaken. For this reason, the layperson is often deluded about the nature of social reality: she often substitutes the 'representations' of social facts for the real thing.

To crack this nut, the sociologist needed to break away from popular perceptions and approach the social world as if for the first time. Here Durkheim follows Descartes' lead in two ways. First, he embraces Descartes' call for reductionism by advising the sociologist to start anew, and build his scientific edifice on sturdier, empirical foundations. Then he makes an explicit reference to Descartes' systematic doubt to explain that the first step in social research is to turn away from all preconceptions and turn attention toward the facts (Durkheim, 1964 [1895], p. 22).

> In the present state of knowledge, we cannot be certain of the exact nature of the state, of sovereignty, political liberty, democracy, socialism, communism, etc. Our method should, then, require our avoidance of all use of these concepts so long as they have not been scientifically established. And yet the words which express them recur constantly in the discussions of sociologists. They are freely employed with great assurance, as though they corresponded to things well known and precisely defined, whereas they awaken in us nothing but confused ideas, a tangle of impressions, prejudices, and emotions. (Durkheim, 1964 [1895], pp. 65–6)

Consider Durkheim's concern with the precision and clarity of language. In the above extract he sounded a loud klaxon to warn against the use of ambiguous terms such as 'freedom', 'democracy', socialism' and so on. Underneath this warning lies the correspondence theory of truth as a bedrock assumption: scientific discussions must be conducted in terms that correspond to phenomena in the Real World – to things well known and well defined. Consider also his famous investigation on suicide. Durkheim's entire argument is built around the empiricist notion that a 'theory' involves a proposition in which one social fact (or class of phenomena; in this case 'suicide') is connected in a certain way with another social fact (or another class of phenomena; in this case 'individualism').

With his *Rules of Sociological Method*, Durkheim sought to provide a sound methodological footing for sociology in particular, and for the other new social sciences in general, but with mixed success. On the one hand, he provided sound advice – such as when he insisted on relying on facts, and using concepts that corresponded to things well known and well defined. On the other hand, he introduced concerns that complicated his task. His distinction between the natural sciences and the social sciences is a case in point. When he argued that the social sciences were different from the natural sciences in terms of the objects observed, he opened up a Pandora's Box in the philosophy of the young social sciences. His distinction was embraced by advocates of more constructivist approaches and used in a vast metaphysical debate that shook the social sciences at the time, and which has since been regularly resurrected by new generations of social scientists.

Durkheim provoked some scholars to wonder whether natural-science ideals were appropriate for the emerging social sciences, and to advocate more humanist and interpretive approaches. These sceptics happily embraced Durkheim's distinction between natural and social objects: they sought to prise the social and natural sciences apart and to sever totally the methodological links with the natural sciences. As we shall see later, some of these sceptics will return to play a larger role in subsequent chapters of this book.

In some ways this was a curious denunciation, as never before had science been able to claim so much progress in so short a time. 'As the century drew to a close, scientists could reflect with satisfaction that they had pinned down most of the mysteries of the physical world: electricity, magnetism, gases, optics, acoustics, kinetics and statistical mechanics, to name just a few, had fallen into order before them' (Bryson, 2003, p. 153). There are reasons to argue that the humanist critique of the naturalist approach was not driven exclusively by academic concerns. The methodological debate that exploded around the fledgling social sciences in the final years of the nineteenth century took place in a turbulent environment. Scientists had produced great feats, but they had also produced great fears. The whole world clanged and chuffed with the machinery that modern science had produced, and societies were changing rapidly as a result; there was a widespread fear that order and morality were unravelling, and that the West was descending irretrievably into a deep crisis. There was also a growing concern that ambitious dictators might harness the insights of modern science for their own nefarious purposes. This latter worry would erupt on a grand scale with the advent of an unprecedented war between the Great Powers of Europe: a war that would engulf the West in a destructive, all-consuming struggle.

Logical Positivism

The First World War brought with it a reaction against all things Prussian – including the Prussian-based philosophy of knowledge. One of the most significant of these reactions emerged among German academics themselves. The result was a leaner and meaner version of empiricism. In the wake of the Great War, in the Austrian capital of Vienna, a small group of German expatriates introduced a tighter and more focused philosophy of knowledge. The members of the so-called Vienna Circle were critical of the abstract and arid nature of metaphysical quarrels, and they strongly opposed what they considered to be the woolly idealism of Germany's philosophy of knowledge (as represented, for example, in the work of Georg Wilhelm Friedrich Hegel's idealistic followers) and the relativism that was increasingly dominating many fronts of human knowledge.

The founder of the Circle, Moritz Schlick (1882–1936), proposed to create a new approach that could provide science with more solid logical foundations. A German physicist, Schlick had moved to Vienna in the wake of Germany's defeat in the First World War. There he was joined by another German expatriate, Rudolf Carnap. These two men were the Circle's driving figures. In addition, Kurt Gödel, Otto Neurath, Herbert Feigl, Philipp Frank, Hans Hahn, Victor Kraft and Friedrich Waismann were all associated with the Vienna Circle and with its philosophical journal, *Erkenntnis*. Finally, it is also necessary to mention Alfred J. Ayer, a young student from Oxford's Department of Philosophy, who went to Vienna in 1932 and sat in on the meetings. He synthesized the discussions in a brilliant little book, *Language, Truth and Logic* (1952 [1936]), through which he became the Circle's most important ambassador in the English-speaking world.

The members of the Vienna Circle were not much interested in metaphysics or in the history of philosophy. Their arguments tended to echo those of David Hume and Auguste Comte. In that sense, their arguments were not particularly revolutionary in content. What was most revolutionary, however, was the form and extreme fervour of their position.

In terms of form, the Vienna Circle insisted on using logic as the primary tool of positive (or naturalist) science. Its members developed a more far-ranging logic, a logic that provided very powerful tools of analysis that the Vienna Circle wanted to turn toward the philosophy of science. In terms of fervour, the Circle tightened and focused the positivism of Comte and Durkheim. Among other things, its members sharpened Comte's already narrow interpretation of Hume's distinction between fact and value.

The fundamental question of the Vienna Circle was: When is an argument scientific? Deeply disturbed by the many ideologues, nationalists, mystics and faith healers who invoked science to support their arguments, members of the Circle searched for a specific and explicit criterion that could distinguish scientific from pseudo-scientific – or 'metaphysical' – arguments. *Fin de siècle* Vienna was one of the most energetic and academically exciting places in Europe – if not the entire world. It was a city of extraordinary talents in the fields of literature, music, art, philosophy and science. City life was famous for its 'nervous splendour', its heady mix of gossip and intellectual brilliance. Among the many topics of Viennese conversation were new academic theories – such as those of the young patent-office clerk, Albert Einstein, who apparently argued that Galileo, Kepler and Newton were mistaken; and those of the smooth and charming young doctor, Sigmund Freud, who claimed he could interpret dreams. The Vienna Circle wanted to know whether these arguments were scientific or not: Was Dr Freud a brilliant doctor or an influential quack? Was Albert Einstein a true scientist?

Moritz Schlick, deeply inspired by the young Austrian philosopher, Ludwig Wittgenstein, imagined that he could settle controversies such as these by identifying a proper *demarcation principle* – that is, a criterion that could distinguish scientific from pseudo-scientific arguments. With such a principle in hand, Schlick hoped he could cut away the intellectually gangrenous tissue of the ailing body of science. Traditional philosophies of knowledge had stressed the role of empirical observations and logic as such demarcation principles. But Schlick was all too aware that pseudo-scientists could also use logic and muster empirical evidence to support their claims. Besides, scientists would inevitably err, while charlatans might stumble across occasional truths. Schlick and his colleagues wanted to hone the arguments of positivism and logic into even sharper tools. They referred to their approach as 'logical positivism'.

The logical positivists subscribed to a single demarcation principle: the *principle of verification*. They argued that all scientific statements had one particular quality in common: that they were meaningful – which meant that they could be subjected to tests that would identify them as true or false. (Statements that could *not* be subjected to such tests were, in contrast, non-scientific or meaningless.) If the Vienna Circle had a basic, founding principle, it was this principle of verification. Using it as their main stick, Circle members beat contemporary scholarship in ways that sent shock waves through the scientific communities, pronouncing Einstein's claims to be scientific while ridiculing Freud's as meaningless drivel.

Karl Popper

Logical positivism's critics came in all shapes and sizes. The young Michael Oakeshott rejected the positivist notion of a unified science as early as 1933, and remained a fierce critic of positivism for the rest of his life. Robin G. Collingwood (1962 [1940]) rejected, almost without reservation, the approach of Ayer and the logical positivists. Collingwood was especially irritated by their short-sighted calls for the elimination of metaphysics, and hurled at them the claim that you can have no knowledge without foreknowledge – as we shall see in subsequent chapters. However, the most significant critic of logical positivism was probably Karl Popper.

Popper lived in Vienna in the early 1930s, but was not a member of its illustrious Circle of philosophers; he taught in a secondary school. Yet, in 1934 he published *The Logic of Scientific Discovery* (Popper, 2002b [1934]), a thick book that levied two objections against logical positivism: one criticizing inductivism, and the other rejecting the verification principle.

Popper was critical of the role of inductivism in the positivist project. He leaned heavily on David Hume: not on 'Hume the empiricist', but on 'Hume the sceptic'. For empiricists, science begins with sense perception and proceeds through systematic observation and the rules of induction toward the development of general laws. Sceptics, however, hold that this argument suffers from a problem of justification: on the basis of observed regularities alone, one cannot use the past to infer any certain knowledge about the future. From the accumulated experience that the sun rises each morning, most people infer the general law that the sun always rises in the morning – and deduce that it will also rise tomorrow. However, this cannot be a logically conclusive inference, because there is no absolute guarantee that what we have seen in the past will persist in the future. The 'law' is ultimately based on an illogical leap of faith – or, to use Hume's expression, on 'habit'.

Popper illustrated this with a simple example using swans. He begins by noting the universal observations (and claims) of European ornithologists that swans are always white (Popper, 2002b, p. 4). However, this inference would be sabotaged by any tourist to the Antipodes who happens to observe the native *Cygnus atratus*: the Australian black swan. The existence of a single black swan is enough to falsify the universal claim that all swans are white.

This argument enabled Popper to launch a second criticism at the logical positivists: Schlick was wrong in thinking that the verification principle can provide a solid basis for knowledge. The world is simply too vast and varied for anyone to demonstrate a general claim to be accurate and true. On the other hand, Popper continued, it is easy to demonstrate that something is materially false. Rather than a verification principle, Popper argued that science could be defined with reference to a *falsification principle*.

Popper was especially critical of Marxism and used it to illustrate his larger point: for young Marxists in the wake of the Bolshevik revolution, the world was filled with verifications of Marxist theory: 'A Marxist could not open a newspaper without finding on every page confirming evidence of his interpretation of history; not only in the news, but also in its presentation – which revealed the class bias of the paper' (Popper, 1989 [1953], p. 35).

This falsification principle led Popper to criticize another aspect of the logical positivist project: he claimed that they quietly assumed that scientific observation was in itself objective, whereas, in reality, most people tend to see what they want to see. Consequently, any systematic observation of the world is already affected by theory – if it were not, the observation could not be systematic. In light of this argument, the central claim by logical positivists – that a scientist could observe the world and systematically induce general statements from these observations – was impossible. Without theory, we fumble helplessly around in the thicket of trees that is the empirical forest.

Popper has made a deep impression on twentieth-century empiricism and its naturalist methodology. Contemporary philosophy of science still reverberates with at least three of his major arguments: (i) his claim that empirical observation is theory-dependent; (ii) his criticism of inductivism; and (iii) his rejection of the verification principle. These three contributions sank logical positivism and left such a profound impression on twentieth-century science that it is worth looking more closely at their implications.

On Theories

One way of illustrating Popper's argument about the theory-dependence of sense perception is via Sir Arthur Conan Doyle's fictitious detective, Sherlock Holmes, whose stated method of discovery bore an uncanny resemblance to the logical positivists' view of science. Holmes goes out into the world to collect pieces of information. He compares and contrasts facts in order to identify a pattern that constitutes the truth. His findings always astonish his faithful sidekick, Dr Watson, who invariably wonders how Holmes arrives at his conclusions. Holmes' answer is always the same. First, you have to acquire all the necessary facts. Then you must combine them in various ways. Finally, you systematically compare each of the various ways against the events of the Real World and eliminate, one by one, those that are not supported by the evidence. In the end, 'when you have eliminated the impossible, whatever remains, however improbable, must be the truth' (Doyle, 1930, ch. 6).

If Holmes' behaviour is observed more closely, however, there are reasons to think that he is pulling the wool over his good friend's eyes.

Consider, for example, the famous case of *Silver Blaze*, which involved a missing racehorse and the murder of its trainer. Doyle (1927, p. 343) describes how Holmes discovers a key piece of information:

> Holmes took the bag, and, descending into the hollow, he pushed the matting into a more central position. Then stretching himself upon his face and leaning his chin upon his hands, he made a careful study of the trampled mud in front of him. 'Hullo!' said he suddenly. 'What's this?' It was a wax vesta, half burned, which was so coated with mud that it looked at first like a little chip of wood.
>
> 'I cannot think how I came to overlook it,' said the inspector with an expression of annoyance.
>
> 'It was invisible, buried in the mud. I only saw it because I was looking for it.'

In this description, Holmes' approach is not at all a careful, open, methodical survey of the Real World. Rather, he obviously has a theory, and that theory tells him what to look for – a wax vesta – before he throws himself on the muddy ground to begin his search. Holmes saw the wax vesta because he was looking for it. But how would Holmes have known what to look for if he hadn't already got a theory?

On Induction

Popper's notion of the theory-dependent nature of observation was an outcome of his thoughts on 'Hume's problem'. As we have already seen, David Hume had begun to ask the first, awkward questions about whether observations could yield general statements, such as theories and laws. Already by the mid-eighteenth century Hume had pointed out that a number of individual observations – however many – could not logically sum to a general statement that was indubitably true.

The sun may have risen every day in the past, but there is no guarantee that it will also rise tomorrow. A pragmatic physicist might brush this claim aside as idle speculation and retort that we *can*, in fact, be pretty sure that the sun will rise tomorrow. Indeed, by our understanding of the laws of physics and astronomy, it is possible to predict the precise time at which the sun will rise tomorrow. Hume would answer the pragmatic physicist twice over. First, the fact that the laws of astronomy have held good in the past does not logically entail that they will continue to hold good in the future. Second, the laws of astronomy are themselves the outcome of many individual observations of the heavens; they are, in short, general statements produced by induction. Attempts to justify induction by appealing to general statements – which are themselves produced by induction – constitutes a tautology, not a valid argument.

For Popper, then, science is not about finding the ultimate truth. It is a process; it builds on general statements. But where these statements come from is not important. We do not evaluate a theory on the basis of where it has come from; it is evaluated on the basis of its explanatory power. Which, of course, raises the question: how do you *do* that?

On Explanation

Popper's answer is that, first, you have to devise an explanation; that is, you have to make a particular kind of statement that identifies the cause of an event. Second, and more to the point, you invoke a universal law and establish a deductive link between the statement and the law:

> To give a *causal explanation* of an event means to deduce a statement which describes it, using as premises of the deduction one or more *universal laws*, together with certain singular statements, the *initial conditions*'. (Popper, 2002b [1934], p. 38, emphasis in original)

Why did the rope break when we lifted the anchor? If we know that the anchor weighed 25 kilograms and, after some investigation, found that the rope had a tensile strength of 20 kilos, we can easily fashion an explanation. This explanation will contain two kinds of statements: first, we have a statement of universal character (or a law) which says that 'whenever a rope is loaded with a weight that exceeds its tensile strength, it will break'. Then we have singular statements (in this case, two), each of which applies only to the specific event in question: (i) 'The weight that can be sustained by the rope is 20 kilos'; and (ii) 'the weight of the anchor is 25 kilos'. From the universal statement (or law) in conjunction with singular statements (which characterize the specific event and which Popper therefore calls specific or 'initial conditions') we can deduce the cause of the rope breaking.

This way of looking at scientific explanations was made famous by the German-born philosopher, Carl Gustav Hempel (1905–97). Hempel (1965, 1969) recognized that there are inductive as well as deductive types of explanations, but all explanations shared the same general characteristics: they invoked a general law and include descriptions of relevant conditions under which the law is valid. Together, these two components first identified by Popper – the general law and the initial or relevant conditions – constitute the premises (the *explanans*) from which an explanatory statement (*explanandum*) could be deduced (Hempel and Oppenheim, 1948). Together, these components constitute Hempel's definition of science, as presented in Figure 2.3. This view, that an event can be explained by invoking a universal law, is commonly referred to

Figure 2.3 *Hempel's definition of science*

$$E = f[(C_1, C_2, \ldots C_n), (L_1, L_2, \ldots L_n)]$$

- C_1, C_2, etc. represent 'conditions' or partial facts – that is, statements concerning the conditions under which the law holds true. In the text's example there are two such conditions: the tensile strength of the rope is 20 kilos; and the anchor weighs 25 kilos.
- L_1, L_2, etc. indicate a 'law' – that is, some regularity in nature that can be captured, for example, by the expression 'whenever a rope is loaded with a weight that exceeds its tensile strength, it will break.'
- E represents the explanandum event – the thing to be explained. E, then, is a function (f) of the laws and conditions under which the laws hold true: it results 'from the particular circumstances specified in C_1, C_2, ... C_n, in accordance with the laws L_1, L_2, ... L_n'.

Source: Based on Hempel (1969 [1962], p. 81).

as the 'Popper–Hempel covering theory of explanation', or simply as 'Hempel's *covering law*'.

One of the intriguing characteristics of Hempel's covering law is that explanation and prediction share an identical logical structure: the logic of the law can be used on past events (for which it is an explanation) or to forecast events in the future. From the universal law which says that 'whenever a rope is loaded with a weight that exceeds its tensile strength, then it will break', in conjunction with the initial conditions that (i) 'the rope can sustain 20 kilos' and (ii) 'the weight of the anchor is 25 kilos', we can predict that the rope will break if we try to lift the anchor by using the rope.

Post-Popper

Popper provides us with a justification for keeping our eye on the empirical terrain, but he does so with a firm reminder of the need to position our empirical inquiry in an explicit theoretical framework. By employing a rigid falsification criterion, scientists are encouraged to maintain a critical attitude toward their research object, and to prepare themselves for the possibility of unintended outcomes.

Subsequent work in the philosophy of science has questioned the utility of relying on a simple, or naïve, falsification criterion, as theories can still maintain much explanatory power, even in the face of aberrant facts. While it is an exaggeration to suggest that this is what Popper meant, his position was often interpreted in too stark a manner, with scientists being expected to jettison a theory as soon as it encountered falsifying evidence, and replace it with a new and better theory. As theories

can remain strong and viable even in the face of much evidence to the contrary, a simple nod to the facts can never settle theoretical differences. Consequently, scientists have needed to develop more flexible relationships toward facts, theories and demarcation principles.

One prominent approach, associated with the Hungarian philosopher of science, Imre Lakatos, is linked to the concept of 'research programmes'. Lakatos (1999 [1970], p. 115) pointed out that science was not just a two-cornered fight between a particular theory and a deviant fact. It is a fairy tale to believe that a single fact can murder a reigning theory by the simple thrust of falsification. In practice, there are always rival theories waiting in the wings – pretenders to the throne, as it were. Solid science requires that we consider them all; that we assess how all theories, princes and pretenders alike, relate to the facts – how strong is the supporting proof and how damaging the dissenting evidence? In practice, Lakatos argued, the progress of science is a complex tug of war for factual support between a reigning theory and its rivals. To secure the crown, a theory needs stronger support than that for its rivals; it has to be able to explain more than any of the others; and it cannot be killed by a single deviant arrow. As Lakatos explicitly recognizes, this is a significant amendment to Popper:

> *Purely negative, destructive criticism, like 'refutation' or demonstration of an inconsistency does not eliminate a programme.* Criticism of a programme is a long and often frustrating process and one must treat budding programmes leniently. One can, of course, *undermine* a research-programme but only with dogged patience. It is usually only *constructive criticism* which, with the help of rival research programmes, can achieve major success; but even so, dramatic, spectacular results become visible only with hindsight and rational reconstruction. (Lakatos, 1969, p. 183, emphasis in original)

For Lakatos, a research programme consists of contending theories, each trying to make the most elegant sense of a universe of unruly facts; all gathering around what he called a 'hard core'. Scientists in a given research programme circle around this hard core and protect it from falsifying facts by fashioning a protective belt of auxiliary hypotheses. Thus the battle for science occurs between competing research programmes, not between individual facts, theories or hypotheses:

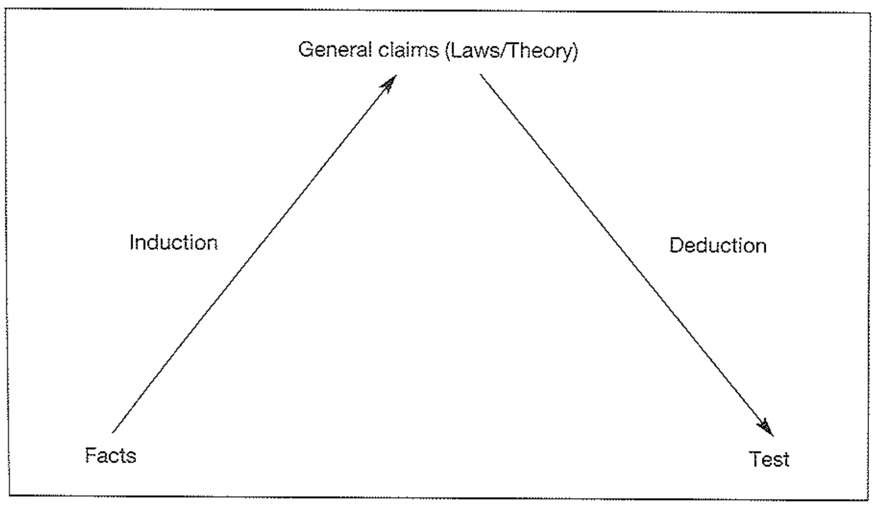
> Newton's theory of gravitation, Einstein's relativity theory, quantum mechanics, Marxism, Freudianism, are all research programmes, each with a characteristic hard core stubbornly defended, each with its more flexible protective belt and each with its elaborate problem-solving

> machinery. Each of them, at any stage of its development, has unsolved problems and undigested anomalies. All theories, in this sense, are born refuted and die refuted. (Lakatos, 1978, p. 5)

Lakatos leaves the modern social scientist on guard. No longer can we wield simple facts and theories in the name of clear truths. Theories do not fall with a single blow from a hard fact. Research programmes are so heavily defended that they lie beyond the reach of a single theoretical or empirical attack. Consequently, the modern social scientist aims to develop arguments in an open-ended fashion. Arguments need to be exposed to the possibility of falsification, and aimed at engaging testable hypotheses that are generated by dominant research programmes. In short, the social scientist needs to employ both falsification and verification in a subtle, nuanced and reflective way.

If Lakatos provides us with the most sophisticated philosophical grounding for the contemporary naturalist approach, most practicing social scientists in this tradition have a simpler understanding of the relationship between facts and theories. This understanding can be depicted in terms of a triangular relationship, but this triangle balances inductive and deductive approaches under a single theoretical rubric. This commonplace approach is depicted in Figure 2.4, where a particular research project is usually engaged with either an inductive (left-hand side) or deductive (right-hand side) component, and where the projects

Figure 2.4 *Inductive–deductive model*



are usually seen as distinct contributions, like two sides to the same coin, or as iterations over time.

In distinguishing between the upside and downside of this triangular endeavour we are consciously promulgating the myth – 'sired by Kant, foaled by the Vienna School, and raced past us in our statistics textbooks' (Stinchcombe, 1978, p. 4) – that one can fruitfully separate the theoretical from the empirical parts of the research design. We do this because this myth continues to play an absolutely central role in the world view of naturalist social science. In practice, of course, even the most dyed-in-the-wool naturalists recognize that it is impossible to begin an empirical study without theoretical expectations, or a theoretical study without empirical experience – a modest combination of both ingredients is necessary before the researcher can even begin.

In short, the naturalist methodology of modern social science reflects the conceptual history sketched above: it mixes the salvageable parts from Logical Positivism, Popper, Hempel and Lakatos. In describing this development we have attained the tools and vocabulary of the modern naturalist scientist, who goes out into the world in search of patterns and regularities that reside in nature.

The naturalist scientist engages the world with a basic hypothesis in mind – something that needs explaining. (Where this hypothesis actually comes from is not easy to explain, as it involves a complicated juggling process that includes both deductive and inductive processes as depicted in Figure 2.4.) This thing in need of explanation is called the *dependent variable*, and is often denoted as Y. The things that explain changes in the dependent variable are called *independent variables*, traditionally referred to as X.

It has been a long-standing habit among philosophers to depict the relationship between such variables by means of a causal arrow: $X \rightarrow Y$. Naturalist social scientists have depicted the relationship differently, however. Influenced by modern mathematics, they have captured it as a simple equation. Here, the dependent variable is placed on the left side of the equals sign and the independent variable placed on the right. Since reality is complex and a phenomenon we want to explain tends to have many causes, modern scientists must allow for many independent variables ($X_1, X_2, \ldots X_n$). Thus modern social scientists tend to depict their propositions in an algebraic expression, like this:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$$

Here the dependent variable (Y) is put on the left side of the equation, while the independent variables (X_1 and X_2) are listed to the right. The coefficients (β_1 and β_2) work as a multiplier to depict the relative strength of the corresponding independent variable in explaining observed variation in the dependent variable. In this equation there is also a constant term (α) and an error term (ε). The role that these variables play in explanation will be elaborated on in Chapter 4. For now we need only note that this algebraic expression implies a linear relationship between the dependent and independent variables. This is a very common (if often unrealistic) assumption among naturalist social scientists, but it is not a necessary feature of the methodology itself. It is tradition and the maths-processing skills of social scientists (and their computers) that limit this approach, not the methodology itself.

Recapitulation: The Naturalist Way of Knowing

The founding fathers of modern science have provided us with a powerful philosophy of knowledge. They have also provided a legitimizing philosophy; naturalists gain an argument that they can use to justify their approach. Locke and Hume, in particular, provide the philosophical foundations for the naturalist approach to social science, to which subsequent naturalists have added boards and planks. The next section will examine these foundations and the component elements – the supporting joists – of the naturalist approach.

The Broad Joists of the Naturalist Methodology

Naturalist social science builds on three broad joists – all of them hewn from the trunk of traditional natural science: one is ontological, another is epistemological, and the third is methodological in nature. These are presented briefly in Figure 2.5.

First, there is the ontological joist. Subsequent naturalists found in Locke and Hume an atomistic *ontology* – a clear notion that the Real World consists of independent particulars. They interpreted Locke and Hume to mean that there *is* a Real World 'out there' – a Real World that exists independently of our senses. This world exists whether human

Figure 2.5 *The three basic joists of naturalist social science*

- An *ontology* of independent particulars.
- An *epistemology* which relies on an idea of accumulated *a posteriori* knowledge of associations (or correlations).
- A *methodology* which seeks to identify regularities in the Real World.

beings are there to observe it or not. Subsequent naturalists have built on this ontological joist a simple definition of 'truth': a statement is true if it accurately corresponds to a state of affairs in the real world. This definition is known as the *correspondence theory of truth*.

The second supporting joist is epistemological. Subsequent naturalists entertain the same *epistemology* as their forebears about the regularities of nature and the drive to document these regularities as accumulated associations. This involves two things. First, it means that knowledge about the regularities of nature is acquired through systematic observations of associated phenomena. Knowledge about the laws of nature is, in other words, acquired through the identification of associations (or variable correlations). This suggests that the ultimate purpose of science is to uncover these regularities and to re-state them as (natural) laws. This knowledge can be gained by reason and deduction, but it must ultimately be confirmed by empirical evidence. Second, the empirical epistemology means that human knowledge grows over time through the accumulation of confirmed correlations. This accumulation is reflected in the growth of increasingly accurate theories.

Finally, there is the methodological joist. Subsequent naturalists have found in Hume a confirmation of the *methodology* of Galileo, Bacon and others. In particular, these authors maintain that the world is filled with many kinds of repetitions and regularities, and the main purpose of naturalist science is to identify these regularities. This means that regularities are observable by the systematic use of human sense perception, and that such observations are communicable.

The Naturalist Hierarchy of Methods

Naturalist science sets out to discover and chart the regularities of the world. Naturalist scholars observe the world, painstakingly collect empirical evidence, then analyse and order it so that they are able to reveal and accumulate knowledge of the regularities of the world. From these tasks, naturalist social scientists seek to account for individual events in the past and predict events in the future. This understanding of the nature of the Real World, and the appropriate way to uncover its truths, has resulted in a firm hierarchy of methods within the naturalist approach to social science.

Francis Bacon and Galileo Galilei rank among the major thinkers in naturalist science. Despite their inductive procedures and experimental designs being probed and amended over the centuries, their basic designs still offer valid models for naturalist ventures. Popper and his followers have not strayed far from these models. Indeed, the experimental design introduced by Galileo and Bacon lies at the very core of the methods preferred by contemporary naturalists. Modern philosophies of naturalist social science are fully congruent with the experimental designs of Bacon and Galileo.

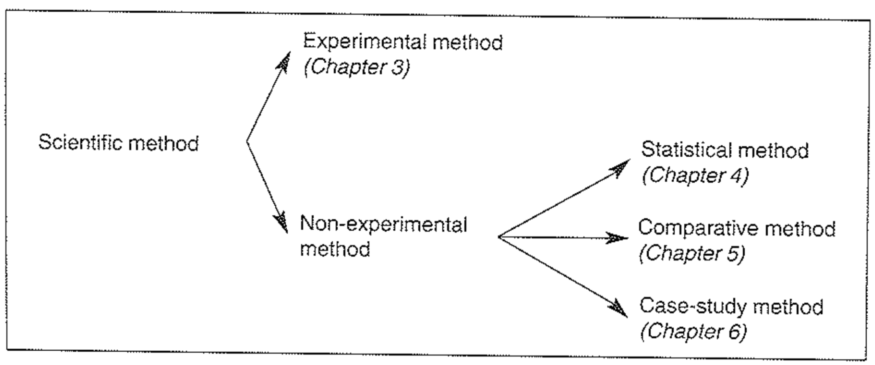
For naturalists, in other words, the experimental method is the ideal – which other methods strive to emulate. This method is ideal because of its ability to control and order causal and temporal relationships. Other methods are less suitable in these regards. Consequently, the experiment ranks as the one true scientific procedure; other methods are deemed to be less accurate or powerful and rank lower on the naturalist scale of preferred methods in social science.

Of course, experiments are often not practical, affordable or ethical. When experimentation is not a realistic choice, naturalist social scientists tend to fall back on the second-best approach: the statistical method. This method tries hard to emulate the basic design of experiments. However, because of a lack of data, even the statistical method can prove impractical, so the social scientist may find it necessary to use a comparative approach designed for a smaller number of observations. In the worst-case scenario, when a research question cannot even be pursued through systematic comparisons, the social scientist may be forced to resort to the case-study or historiographic method, which lies at the bottom of the naturalist's hierarchy of methods. Naturalist social science is expected to employ this method only when faced with a yawning paucity of data.

The existence of such a hierarchy of methods is a commonly entertained notion in the naturalist social sciences. Arend Lijphart (1975) has given this notion a classic expression, as depicted in Figure 2.6.

We employ this hierarchy as a pedagogic device because we wish to emphasize the different roles that methods can play when placed

Figure 2.6 *The hierarchy of methods in the naturalist tradition*



Source: Based on Lijphart (1975, p. 162).

in different methodological contexts. But it is also interesting to note the different roles that each of these methods can play in investigating different types of causal relationships. For example, Bennett and Elman (2006, p. 457), referencing Brady's (2002) work, note how statistical analyses lend themselves to examining neo-Humean regularity theories of causation, experimental approaches are consistent with counterfactual and manipulation-based theories of causation, while case studies can be used to map out the particular causal mechanisms we associate with more process-oriented understandings of causation.

The first half of the book that follows is organized with Figure 2.6 in mind. Thus Chapter 3 – discusses the ideal, experimental, method. Subsequent chapters will then introduce other methods in descending order of usefulness to the naturalist social scientist: Chapter 4 discusses statistics, Chapter 5 comparisons, and Chapter 6 will describe case studies and historical methods.

Recommended Further Reading

Readers who want to trace the philosophical roots of the naturalist tradition should return to the original: David Hume's *An Inquiry Concerning Human Understanding* (1983) [1748]). The classic formulation of logical positivism is Alfred Ayer's *Language, Truth and Logic* (1952). Karl Popper's (1989 [1953]) *Conjectures and Refutations: The Growth of Scientific Knowledge* is the best portal for accessing his immense influence on contemporary social science. For a more up-to-date introduction to larger philosophy of science issues, read Martin Hollis's *The Philosophy of Social Science* (1994).

Recommended Further Reading

For a description of how Galileo's telescope changed the nature of truth and altered our understanding of the world, see James Burke's *The Day the Universe Changed* (1985). Fritjof Capra's *The Turning Point* (1982) also provides a very accessible introduction to a new way of understanding the world. For a very broad introduction to the philosophy of social science issues, see Martin Hollis's *The Philosophy of Social Science* (1994). R. G. Collingwood's *Essay on Metaphysics* (1962) and his *The Idea of History* (1956) provide central contributions to an alternative to the naturalist methodology, while Paul Feyerabend's *Against Method* (1975) provides additional philosophical support.

Chapter 8

A Constructivist Philosophy of Science

Behind us, in Chapters 1–6, we have left the empirical quest for certain knowledge; ahead of us lie doubt, difference and dissent. Chapter 7 planted the seeds of doubt, and here we seek to identify some of the wild methodological vines that have grown from those seeds. Our intention is to harvest a constructivist alternative to the naturalist philosophy of science described in Chapter 2.

In Chapter 2 we began by introducing David Hume and hailing his *An Inquiry Concerning Understanding* (1983 [1748]) as a major contribution to Western philosophy of knowledge. In this chapter we introduce a rival, constructivist view. This chapter too begins with Hume. However, it does not discuss the naturalist legacy that emanated from his *Inquiry*; instead, it focuses on the reactions it provoked. First, we turn the spotlight on Immanuel Kant. He read Hume's argument with disbelief and made it his life's vocation to dispel it. In our view, it is in Kant's sustained reaction that we find the ontological taproot for the constructivist approach to the social sciences.

The naturalist and constructivist traditions both recognize the need to map and explain patterns in the world. However, they differ sharply over the source of these patterns – as is reflected in their respective titles: naturalists understand patterns and regularities to be an essential part of nature; constructivists trace these patterns back to the mind that observes them. For the constructivist, then, the world we observe is, in a sense, a world of our own making. Consequently, naturalists and constructivists tend to have different attitudes toward, and approaches to, uncovering the truth; constructivists often wonder whether there is in fact a singular truth out there at all.

To gain access to Kant, we invoke an almost forgotten Kantian scholar from the nineteenth century: William Whewell. He will help us to consider the different ways in which we are ourselves responsible for the patterns we observe in the social world. With Whewell it is easier to see how knowledge is dependent on context – how history, society, ideas and language influence the patterns we observe and the concepts we use to explain and understand them. Consequently, Whewell's approach is less beholden to empiricism, and encourages us to embrace a much larger range of epistemological outlets.

From the vantage point provided by Whewell, we can then survey the broad field of contemporary constructivist approaches and elaborate on the core components of constructivist social science. With these methodological components as a vantage point, we can help students to compare a constructivist philosophy of science with its naturalist counterpart, as depicted in Chapter 2. In addition, these common methodological elements can help us to better understand how constructivism is applied in the particular methods' chapters that follow.

On Natural and Other Worlds

Constructivists begin by recognizing that there is a big gap separating the natural and the social worlds. As we saw in Chapter 7, constructivists share this position with a much larger group of social analysts. As a result, we find events being explained in different ways when they occur in either the natural or the social world.

To see these differences, let us return to John Stuart Mill, who once remarked that '[a] bird or a stone, a man or a wise man, means simply an object having such and such attributes' (Mill, 2002 [1891], p. 59). Clearly, all three objects are material; and as such they share common characteristics (for example, they have mass and extension), and are subject to the same natural laws.

Imagine Galileo climbing the stairs of Pisa's Leaning Tower carrying a stone in one hand, followed by a wise man carrying a cage with a bird inside. After dropping the stone and the bird cage from the top of the tower, and taking careful notes, we might expect Galileo to conclude that the stone and the bird drop in accordance with their relative weight. After all, each of them acts as a material object. Provided the bird was still in its cage. Or dead.

Alive, of course, the objects would behave differently. If Galileo dropped a stone from the top of the tower, it would fall straight down to the ground below. Should he take the bird out of its cage, its behaviour would deviate radically from that of the stone: it would fly away. And if Galileo revealed his intentions to throw the wise man over the parapet, he would probably put up a lively struggle. (Once tossed, however, we would expect the wise man to drop like the stone, albeit with more animation.)

If we twist this example one more turn, we might think about how a puzzled observer on the ground would respond after witnessing the entire procedure. When interviewed by a local journalist about these odd circumstances we can imagine her revealing answers to a string of questions:

Journalist: Why do you think he dropped the stone?
Witness: I guess it was to see how quickly it dropped. Galileo is known in the neighbourhood for doing these sorts of things.
Journalist: Why did he drop the bird?
Witness: I suppose he wanted to see if it could fly. Why else would you drop a bird from the top of a tower?
Journalist: Why, then, do you think he dropped the man off the top of the tower?
Witness: How the hell would I know? I didn't see any sort of struggle. Perhaps the guy was a rival scientist? This is all very unsettling ....

In short, when we begin to look beyond an object's material qualities, and come to recognize the real differences that distinguish stones, birds and men, then we begin to discover that different principles of explanation might apply to each of them. There is nothing particularly odd about dropping a stone, so the observer focuses on the natural factors pulling the stone: we want to know how it works. A bird's actions are more varied, so we begin to look for explanations in the bird ('it can fly') or in factors external to the bird (for example, in the density of the air and references to the laws of aerodynamics). With the most complex object, a man, we begin to search for more complex reasons: we search for a meaning. The sundry attributes of diverse objects encourage us to think in terms of different explanations for their behaviour.

This is the sort of puzzle that David Hume worked on when speculating about the nature of causation. But Hume's laboratory of choice was not a leaning tower, but a billiards hall. Hume wanted to know why a particular billiard ball moved. He reasoned that we must search for a *cause* that is external to the ball – for example, that it was hit by another ball. Likewise, if we want to know the *reason* why that second ball moved, we may find that it was set in motion by a pool player – again, an example of an external cause. But if we want to *explain* why the pool player set his ball in motion, the search for an external cause becomes more complicated. In one sense, we can find an external cause in the rules of the game of billiards. But game rules are hardly an external cause in the material sense of the term. The rules of the game are a social construct; they are something that pool players have invented; they are a convention. Herein lies a dilemma, then, as the cause can also be seen to be internal, because the rules of the game *are* the game of billiards.

The rules *constitute* the game. As such, they also give meaning to the pool player's action (that is, setting the ball in motion).

To summarize from Hume's example: we can immediately distinguish between three clear reasons (or causes) for why a man sets a billiard ball in motion: (i) a physical cause (on which Hume focused); (ii) an intentional cause (the man wanted to play snooker); and (iii) an institutional cause (the rules of billiards informed the man what he could do). We may add more; we may, for example, add a functional cause (the man knew what would happen if he used the pool cue in the usual way).

For naturalists, it is important to delineate a common underlying structure for scientific explanations, even while recognizing that they could rely on different (deductive and inductive) types. In Chapter 2 we used Hempel's covering law to introduce this structure. Constructivists, by contrast, are less interested in the common structure of explanation as they are in mapping the different forms of explanations, and the origins of this variance.

The examples above illustrate some of this potential variance, and Table 8.1 presents a typology of several kinds of explanations. We hasten to point out that this is a very simple typology for thinking about the different principles of explanation and their relationship to their objects of study (and their requisite scientific discipline). We do not mean to suggest that we are limited to these types of explanations; that some types of explanation are better than others; or that students of human behaviour should not use causal or functional arguments (for example).

In the left-hand column of the table we distinguish between inanimate and animate objects (the latter being further divided into plants, animals and humans). The middle two columns describe the properties and scientific disciplines usually associated with these types of objects – Botany

Table 8.1 *Objects, sciences and their principles of explanation*

Object	*Properties*	*Science*	*Principle of explanation*
Inanimate	Mass and extension	Physics	Causality
Animate	Mass and extension		
Plants	+ vital force	Botany	Adaptation
Animals	+ vital force	Zoology	Function
Humans	+ vital force	Social	Volition, interest
	+ will and reason	Sciences	Meaning, rules, institutions, praxis

Source: Inspired by Elster (1979).

studies plants, Zoology studies animals and so on. While the scientific disciplines are fairly straightforward, we might explain the content of the second column in a little more detail: here we see that inanimate and animate objects share material qualities (mass and extension), but animate objects are different from inanimate objects in that they are alive (they are characterized by what Whewell calls a 'vital force'). Among animate objects, humans distinguish themselves further by having recourse to will and reason (in addition to having both mass and extension, and the vital force).

In the column entitled 'Principle of explanation' we indicate the several ways in which the various objects are commonly explained within their proper discipline. Inanimate objects lend themselves to *causal* explanations – this is the traditional explanatory principle in Physics. Animate objects, however, may be accounted for in different ways. The behaviour of plants and animals can also be explained in terms of causality; but more often they are accounted for in terms of *adaptation* or *function*. Human behaviour can be explained in all these terms. However, because human beings are endowed with reason, language and free will, human actions can also be explained by other principles (for example, *volition*, *interest* or *meaning*).

There are two points worth emphasizing in this table. First, it is possible to detect a pattern: the simplest objects are associated with the simplest explanations, while the more complex objects come with correspondingly complex explanations. Second, we note that the typology is inclusive: all objects (both inanimate and animate) have mass and extension. For this reason, all these objects can be measured, weighed and counted – and their behaviour can be explained in terms of external causality. But when we begin to note the more individual attributes of an object, we see that other principles of explanation can also apply: because of the vital force inherent to them, the behaviour of plants and animals (including humans) can be explained in terms of adaptation and function (in addition to causality). Finally, humans can be further distinguished by their use of reason, will and meaningful speech. These capacities give rise to an even wider variety of potential explanations.

These examples are used to describe the complicated nature of the relationship between the natural and social worlds. In many important respects, the two worlds are quite alike, and these similarities mean that explanatory principles developed for studying the natural world can often be applied (with great effect) also to social phenomena. On the other hand, the examples also suggest that the nature of human interaction is quite different from the way in which inanimate objects interact. Consequently, it is possible to explain human interaction by recourse to a much larger set of explanatory principles.

Beneath all of this complexity lies a view of the world that recognizes the subjectivity and illusiveness of social patterns. The next section will introduce the ontological foundations of such a view.

The Awakening

In Chapter 2 we learned that David Hume was an empiricist. Like other empiricists before him, Hume believed that we have access to the Real World through our senses. We look out of the window and see trees and bushes, rocks on the grounds, buses on the roads, and birds in the air. From these observations we gather systematic knowledge about the world, and if we are scientists, we seek to induce general statements from our observations.

But Hume was also a sceptic. In spite of his empiricist sympathies, he warned us of induction's potential pitfalls. After all, we cannot trust inductive reasoning to produce general statements that are true; because induction is based on observed events, and observed events can never embrace *all* possible objects/events of the world. Our experience with past regularities is no guarantee that the future will bring similar regularities. Karl Popper illustrated this point with reference to the colour of swans. Bertrand Russell illustrates this point with another bird: the 'inductive turkey'. On the first morning a turkey arrives at a farm he notices that feeding time is five a.m. Each day the turkey experiences the same thing: food comes at five. With the passing of time, and with the turkey having noted the regularity of his feeding time, the turkey eventually infers that he is always fed at 5 a.m. Unfortunately (for the turkey), this inference proved to be faulty. At 5 a.m. on 25 December, the unlucky turkey was not fed, but slaughtered for Christmas dinner.

In a similar way, Hume argued that we cannot infer beyond our own limited experience. This is a big step for any empiricist. To make this step easier, Hume retreated from the most radical destination to which it led; he took refuge in a pragmatic argument that rested on the principle of human habit. In short, Hume came to accept that there are natural limitations to what we can know about causality.

On Pure Concepts and Natural Ideas

Hume's argument was earth-rattling stuff for scientists in his day. Causation was (and is) a central object of scientific discovery, and to suggest that it rested on such flimsy ground had the effect of shaking the very foundations of science and metaphysics. The effect was strong enough to wake Immanuel Kant from what he later described as his 'dogmatic slumber' (1969 [1783], p. 302). Kant understood the serious implications of Hume's argument, and he was not willing to leave causality resting on such shaky foundations.

If Hume was correct, the whole of science was in danger. Worse (for Kant, who was a philosopher by profession), if causality proved to be beyond the grasp of our understanding, it is possible that other metaphysical concepts might prove to be just as elusive. Kant immediately set out to construct a sturdier basis for understanding causation. As he sought to improve on Hume – who understood causation as a habitual expression (mechanically produced by the association of ideas) – the scope of Kant's enquiry expanded. Causation was not habit, Kant averred; it was part of a bigger and more general property of the nature of the human condition.

On the surface of things, it appears as though Kant ended up in the philosophical vicinity of Hume: both developed a philosophy of knowledge that directed attention away from the Real World and turned it on the nature of the human mind. But surface appearances are often misleading. The two philosophers developed very different ways of understanding human knowledge, and ultimately informed very different philosophies of science.

To understand the differences that separate these two great thinkers, we need to recall Hume's understanding of causation (from Chapter 2) and how it rested on his theory of sense perception: namely, that the human mind absorbs impressions through the senses. Kant was willing, in part, to accept this theory of sense perception. He agreed that the senses presented perceptions to the mind. However, he could not agree with the notion that the human mind is an empty vessel, into which sense impressions fall passively. For Kant, the senses merely brought perceptions to the doorstep of the mind. It was then up to the mind to organize these perceptions, categorize them, and store them for later use. To perform this task, the human mind comes already equipped with basic preconditioning concepts – which it then uses to harness the flux of sense perceptions delivered to its doorstep. Thus Kant concluded that the mind is an agent in its own right. It acts as an interpreter of the impressions that come to it from the external world.

But if each human mind is an active interpreter of sense impressions, how is it possible for different people to agree on what the world looks like? How is it possible to agree on anything at all? The answers to these important questions are not as daunting as they first appear. Kant argued that we all share certain basic preconditioning or organizing ideas. Indeed, possessing these basic ideas is part of what it means to be human. In other words, all human beings share a set of basic categories and concepts that organize the perceptions that our senses deliver to the mind from the outside world.

In the end, Kant identified 12 such pure concepts (or forms of understanding), through which all human perceptions must pass on their way to objective knowledge. These are listed in Table 8.2, where we can see that Kant organized these basic ideas into four sets: (i) quantity of objects; (ii) quality of objects; (iii) their relation to each other; and (iv) their mode of existence (or modality). After these 12 pure concepts had done their work – after their sorting work was done – the processed sensations were conveyed to the conscious mind.

Everything we perceive is channelled through these categories of our mind. Without them we could not perceive or know anything. Arguing in this way, Kant was able to save modern science from Hume's excessive scepticism. Newtonian physics and the universal laws of nature (for example) were saved from the horrible uncertainty to which Hume had exposed them. With Kant, scientists could continue to assume that the laws of nature would apply indefinitely. But Kant's rescue came at a very high cost. In providing the necessary groundwork for assuming the universality of nature's laws, Kant shifted the ontological terrain from nature to the human mind. In other words, Kant shows us how Newton's ordered universe (for example) was not anchored in nature; it was anchored, instead, in universal and necessary concepts of the human mind.

This is an important argument. We should point out that Kant is *not* making a distinction between the social and natural worlds, as we did in the introduction to this chapter. Instead, he is distinguishing between a Real World and the way it is perceived by us. In other words, Kant is telling us that the laws of nature may not belong to the Real World. Worse (for naturalists, at least), Kant is claiming that those Real World patterns (that we observe so clearly) belong to the human mind; that the human mind imposes its own patterns on nature and the world. The implication is, of course, that we can never observe or know the Real World – 'objectively' as it were. We can never say anything about how the Real World is 'in itself'. This was precisely what Kant taught Boas, after struggling with ways to define variations in blue water: that the only thing we can really observe are our perceptions of the world: how the world appears to us.

Table 8.2 *Kant's pure concepts of understanding*

Quantity	*Quality*	*Relation*	*Modality*
Unity	Affirmation	Substance–accidents	Possibility
Plurality	Negation	Cause–effect	Actuality
Totality	Limitation	Causal reciprocity	Necessity

Source: Based on Kant (1929 [1787], p. 113).

The World of Our Making

This discussion is leading us down a very difficult and winding path, and at its end is the unanswerable question about whether a Real World actually exists, independent of our existence. For Kant it was important to emphasize that he was not denying the existence of a Real World. He was simply saying that we have no way of knowing anything about that Real World (the *noumena*). All we know is that our perceptions (*phenoumena*) of the Real World are somehow related to it. But the nature of that relationship remains complex and ambiguous: they seem to coexist simultaneously. (As Kant's pure concepts include causation, it is problematic to say that the *noumena* cause us to have perceptions of *phenoumena*.) Nor was Kant advocating more metaphysical speculation; he was committed to pursuing philosophy within the narrow 'limits of pure reason', and to recognizing that most positive knowledge could only come about through sense perception.

Kant introduces a rather serious problem for social scientists interested in understanding the world. He forces us to recognize that our human faculties are limited: our sense perceptions and our reason pertain only to the world of *phenoumena*, not to the *noumena*. In effect, Kant makes us realize the limits of both reason and sensory perception as tools that can help us to understand the Real World.

The Unwieldy World of William Whewell

In Immanuel Kant we have found a philosophical sponsor for the constructivist approach. Kant introduced an important ontological twist: the realization that the world we live in is a world as it appears to us – a world of *phenoumena*. Again, this is not to say that the Real World doesn't exist; only that it is beyond our capacity to observe and understand it directly. Under these very different ontological conditions, we need to rethink the role of our senses and reason in providing neutral or objective knowledge. Before we can do this, however, we need to think about how these pure concepts might generate patterns of relevance for social scientists. For this, we turn to William Whewell.

From today's vantage point, William Whewell (1794–1866) appears as a rather obscure British philosopher of science. In his own context, however, Whewell was well known. He was also controversial, because he explicitly challenged the naturalist ontology and engaged in debate with John Stuart Mill – the very embodiment of the naturalist tradition in mid-nineteenth-century Britain.

Whewell seems to have been joined at the hip to Trinity College, Cambridge: he studied there, became a fellow, then a tutor, and finally served as its Master from 1841 until his death. His academic output was exceptional, in both abundance and diversity. He taught and published on subjects as wide-ranging as astronomy, the tides, technology and moral philosophy. However, his principal work – in length and by the central position it occupied in his thought – was in the field of scientific methodology, as collected in two major studies: his *History of the Inductive Sciences* (1967 [1837]) and his *Philosophy of the Inductive Sciences* (1996 [1840]). The former is a general history of the natural sciences with a strong critique of empiricism, while the latter provides a systematic summary of the lessons Whewell drew from his historical investigations.

Whewell's critique of naturalism took aim at one of its originators: John Locke. Though Locke had argued that induction lies at the heart of modern science, his own approach was remarkably theory-driven. As Whewell showed, all indications suggest that Locke subscribed to his theory of sense perception long before he had found the facts needed to support its presuppositions. Whewell, by contrast, did what Locke and other empiricists should have done: he looked carefully at how science had actually evolved, and how its method was revealed in history. The result was his impressive, three-volume work, *History of the Inductive Sciences*.

The cumulative results of Whewell's work were three strong attacks on the naturalist tradition. First, he argued that the naturalist's *methodology* is completely wrong: naturalists (such as Locke and his followers) had misunderstood Bacon and his concept of induction. Scientists do not begin with particular observations and infer general theories from them. Scientists begin with a question. They then imagine many possible answers. Finally, they test various answers against the available facts in a process of active tinkering and systematic experiment.

Whewell singles out the breakthrough case of Johannes Kepler to illustrate the praxis of science. Kepler had many observations of the night sky at his disposal – he knew where many heavenly bodies had been on thousands of different dates. He struggled to find a pattern into which all of these could fit, and worked for years to make the heavenly bodies fit into a simple, general conception. Whewell wrote:

> [We] know from his own narrative how hard he [Kepler] struggled and laboured to find the right conception; how many conceptions he tried and rejected; what corrections and adjustments of his first guesses he afterwards introduced. In his case we see in the most conspicuous manner the philosopher impressing his own ideal conception upon the facts; the facts being exactly fitted to this conception, although no one before had detected such a fitness. And in like manner, in all other cases, the discovery of a truth by induction consists in finding a conception or combination of conceptions which agrees with, connects, and arranges the facts.
>
> Such ideal conceptions or combinations of conceptions, superinduced upon the facts, and reducing them to rule and order, are *theories* . . . [A theory, then,] . . . is a truth collected from facts by induction; that is, by superinducing upon the facts ideal conceptions such as they truly agree with. (Whewell, 1996 [1840], p. 42f)

Whewell's approach seems to be very close to what the nineteenth-century American philosopher, Charles S. Peirce (1992 [1898]), referred to as 'retroduction'. Its essence involves the forming and accepting (on probation) of a hypothesis to explain surprising facts. Peirce argued that retroductive reasoning was similar to induction in that it involved a movement from individual observations to a connective proposition; but it was different from induction in that it ended in a self-consciously conjectural act – in a hunch or a proposition which could, in turn, be tested.

Whewell's second broadside was aimed at the naturalist's reliance on empiricist *epistemology*, which he held was sadly incomplete and half-right at best. The naturalists correctly assume that sense perception is vitally important to the acquisition of scientific knowledge; but Whewell argued that sense perception is only half the story: science also depends on the appropriate processing of perceptions and on this count the naturalists fall woefully short. In this argument, Whewell draws heavily on Kant. Indeed, he freely admits that he 'adopted Kant's reasoning respecting the nature of Space and Time,' though he distanced himself from the metaphysical system of Kant and his followers (Whewell, 1996, p. x). Whewell was not the person to push this argument and probe its deeper implications; he did not direct his scholarly attention toward speculations on the inner workings on the human mind. Instead, Whewell focused his attention on the empirical world (which scientists investigate), and on society (in which scientists live).

Finally, Whewell charged the naturalists with being *ontologically* arrogant. Here, too, he borrowed arguments from Kant, but sharpened them to a polemical point. Naturalists, he claimed, are full of themselves: they are convinced that there is a Real World out there, but they have few if any metaphysical arguments to show that this is the case.

In short, Whewell argued that naturalists are methodologically wrong, epistemologically incomplete and ontologically shallow. We can now understand better why he drew so much critical attention. Whewell showed how naturalists claim to have accumulated a good deal of knowledge about the world. But they can't show that it is *true* knowledge. Indeed, they can't even show that their knowledge (even if it were true) is knowledge about the *Real* World.

Disparate Pieces to a New Philosophy of Science

It is not enough to recognize that the mind uses pure concepts (or 'fundamental ideas' as Whewell calls them). We need to know how these concepts can create patterns – patterns that attract the interest of the social scientist. Whewell recognized that we acquire knowledge through our senses, but not through the senses alone. Clearly, more factors are involved, but what can they be?

Whewell's work on the history and nature of science is encyclopaedic. The modern reader can easily follow its rich seams and extract from them arguments about how we create and grasp the patterns central to our understanding of the world. Here we want to focus on four such seams: the roles of *history*, *society*, *ideas* and *communication* (or language). Though Whewell himself did not produce this exact list of factors, it is not difficult to trace them in his writings. In doing so, we hope to show the breadth and power of constructivist approaches, as represented in the work of more recent authors. In other words, we follow Whewell's initial insights with several influential and more contemporary examples. By dividing the literature in this way, it is important to emphasize that our list is not meant to be exhaustive. We provide one possible path through a vast and varied terrain.

The Role of History

On the basis of his vast study of the history of ideas and of scientific discoveries, Whewell concluded that history displays no steady accumulation of singular insights. There is no clear and obvious pattern of cumulative growth in the history of human knowledge. Instead, it displays periods of rapid progress, interspersed with periods of stagnation. If the history of science had a pattern, argued Whewell, it was not steady progress, but a dialectical movement in which inductive periods alternate with periods of synthesis and generalization.

Instead of entertaining a simple, historical teleology of human knowledge, Whewell cast knowledge in sociological terms. He argued that societies share a pool of common knowledge, and envisioned these pools as being dynamic and ever-changing. Knowledge changes over time – often in fits and starts. For example, in the past, people were not commonly aware that the planets orbited the sun; even learned Renaissance astronomers claimed that the planets travelled in perfect circles around the Earth. When Copernicus, Kepler and Galileo argued that this was an erroneous view, they ignited a scientific revolution, in which the old idea of a geocentric universe was replaced by a new, heliocentric one.

With examples such as this, Whewell argued that science – indeed, human knowledge in general – is historical in nature. More recently, this basic notion has been popularized by one of the most influential philosophers of science in the twentieth century: the American physicist and historian, Thomas Kuhn (1922–96).

Brother, Can You Paradigm?

Kuhn's first book, *The Copernican Revolution* (1957) was a case study of the episode that Whewell used to illustrate his view of scientific change: the story of how the old Aristotelian approach to the physical sciences broke down when confronted with the observation-based arguments of Copernicus and Galileo. Kuhn concluded that this change involved something more than a simple victory of 'reason' over prejudice; it involved a more basic change in perspective and world view.

In his second book, *The Structure of Scientific Revolutions* (1970 [1962]), Kuhn cultivated this conclusion and argued that scientists are not as open-minded as is commonly assumed. Rather, scientists are committed to established truths – 'conceptual, theoretical, instrumental and methodological' (Kuhn, 1970, p. 42). Indeed, the Church scholars who defended Aristotle against Galileo and the New Sciences were representative of the way in which scientists generally behave: they seek to defend established theories and reject the arguments of their critics.

Most scientists conduct problem-solving tasks within an orthodox, commonly-accepted, theoretical framework. Kuhn calls this framework a 'disciplinary matrix' or a *paradigm*, which he defines as 'the entire constellation of beliefs, values, techniques and so on shared by the members of a given community' (Kuhn, 1970, p. 173). He then calls the puzzle-solving routine activities that take place within these paradigms *normal science*.

The practitioners of normal science form a collegial group: they are tied together by commonality and a commitment to the kinds of questions asked; they follow similar procedures to answer those questions; and they agree about the form that those answers should take. The questions asked, procedures followed and answers inferred are then assessed by colleagues. This peer review process draws on the most relevant experts to evaluate the research being produced. In doing so, the process reproduces normal science as a self-sustaining, puzzle-solving process within the framework of a dominant paradigm.

A revolution occurs when one of these dominant paradigms breaks down. This might result from some observant scientist discovering an inconvenient fact that does not fit easily within established theories – as when Copernicus observed that the planets did not travel in perfect circles around the earth, or when Galileo noted that there were mountains on the moon. Efforts to explain new and anomalous observations complicate existing theories and introduce inconsistencies. Normal science no longer performs in the expected manner, as it cannot provide satisfactory answers. It fails or goes astray:

> And when it does – when, that is, the profession can no longer evade anomalies that subvert the existing tradition of scientific practice – then begin the extraordinary investigations that lead the profession at last to a new set of commitments, a new basis for the practice of science. The extraordinary episodes in which that shift of professional commitments occurs are the ones known in this essay as scientific revolutions. They are the tradition-shattering complements to the tradition-bound activity of normal science. (Kuhn, 1970, p. 6)

The basic point of Kuhn's argument is that scientists typically go around for years believing one thing – despite mounting evidence to the contrary – happily practicing the established routines of normal science. All of a sudden they notice a mass of conflicting evidence, change their minds, and wonder how they could have ever believed otherwise.

Naturalists may accept this basic idea, admitting that scientific knowledge is not merely a product of slow and steady accumulation; however, they do so reluctantly. Some naturalist social scientists embrace Kuhn's description of the structure of scientific revolutions by arguing that the social sciences are pre-paradigmatic; that the social sciences are younger than the natural sciences, and that they have not been able to draw on a similar amount of resources as the natural sciences. The argument holds that when social science matures and is properly funded, we can expect to see it reach the same paradigmatic stage as the natural sciences: becoming cumulative, stable and predictive.

Constructivists, by contrast, embrace enthusiastically the idea that human knowledge has evolved, not through accumulation but through sudden shifts and bounds. In fact, most constructivists would probably embrace Whewell's hazy original more readily than Kuhn's souped-up argument that science goes through revolutionary periods driven by the discovery of new sensual evidence. This is because constructivists like to point out that old paradigms in the social sciences may be replaced, but they seldom fade entirely away. Constructivists choose to situate such changes in a larger, social context and point to the way in which social

scientific fashion swings in tandem with various constellations of power. This brings us to our second source of patterns: society.

The Impact of Society

Whewell recognized that science relied on specialized knowledge, produced by specialized scholars. Scientists – a word that Whewell seems to have invented – are knowledgeable people. Yet knowledge alone does not make scholarship; and knowledgeable people do not always become scholars and scientists. A scientist is not a scientist simply by virtue of the many facts he knows. For Whewell, knowledge is affected both by individuals (as 'carriers' of knowledge) and by the societies they compose (as 'pools' of knowledge).

Individuals as Carriers of Knowledge

How is an economist different from other people who talk about money? How is a political scientist different from other people who talk about politics? One important difference concerns the *nature* (not the amount) of their knowledge. Scholars are self-conscious about the methods and theories that they have at their disposal; 'other people' may be interested in money and politics, but they do not master the methods and theories of the professional economists or political scientists (and may not even have a desire to do so).

Another difference concerns the *context* of the knowledge. Scholars command facts, methods and theories; but these are always subjects of controversy and objects of discussion. Facts and arguments presented by one scholar are immediately seized on by others and subjected to scrutiny, checking and criticism. Scholars are both aware of and familiar with these sorts of professional debates. As professionals they know the history of their discipline – including its history of controversies.

Finally, there is the *social* or *communal* aspect of scientific knowledge. Scholars are tied together in distinct scholarly communities by a common knowledge of debates and arguments – in the past, as well as in the present. These communities institutionalize themselves as professional societies and associations. In the earliest times, this was done on an informal basis, in terms of acquaintance networks. More recently, however, scholars have organized themselves into scientific societies, with formal memberships, annual conferences and membership journals.

These societies of scholars facilitate the circulation of arguments and encourage scientific discussions. In particular, they help to ensure that new arguments are subjected to scrutiny, control and criticism by fellow scientists. The result is the development of distinct disciplinary heritages, myths and academic traditions, and a web of interrelationships and acquaintanceships among scholarly colleagues that strengthen professional solidarity. These professional societies are, in other, words community- and identity-building mechanisms that tie distinct communities of scholars together with a common knowledge of debates and arguments.

Societies as Pools of Knowledge

Whewell considered Locke's philosophy of science to rest on a simplistic and dubious claim: that sense perception is the basis for all knowledge. If this were true, knowledge would depend on the individual and on the his or her perceptions, and as a consequence, all knowledge would be contingent. But knowledge is *not* contingent. Furthermore, it is clearly more than the sum of individual perceptions. Whewell argued that facts, ideas and arguments do not always originate with individuals; they are sustained and maintained by social relationships and thus have an impersonal quality to them.

In theory, knowledge is based on sense perception. In practice, however, people do not obtain knowledge by observing the world; they obtain it by interacting with other people. Two consequences flow from this view of science as a social activity. First, people get most of their knowledge by learning from others – through watching, listening and by reading texts written by others. In short, people obtain knowledge by consulting a pool of available and common knowledge produced and maintained – or carried by – members of the society that exist around them. Second, knowledge is social and impersonal – or, better, transpersonal or interpersonal. Knowledge is part and parcel of the social community in which people live. This community shapes people's knowledge and affects the way they perceive the world.

This argument has evolved into what we now refer to as 'sociology of knowledge' (*Wissenssoziologie*), a term coined by Max Scheler in Germany in the 1920s. Scheler drew on Marx, Nietzsche and others to show how human ideas, knowledge and consciousness in general are conditioned by social conditions, but not determined by them. His writings triggered a debate in Germany, which was quickly carried into the English-speaking world – to a large extent by Jewish refugees from Hitler's Nazi regime. It was introduced to Britain by Karl Mannheim (1936), who held a more radical view than Scheler – arguing that the social context determined not only the appearance but also the content of human knowledge. It was taken to the USA by authors such as Alfred Schütz and members of the *Institut für Sozialforschung* in Frankfurt am Main.

This so-called 'Frankfurt School' had a political agenda. Its members included, among others, Herbert Marcuse, Max Horkheimer, Theodore Adorno, Erich Fromm, Leo Lowenthal and Jürgen Habermas; they aimed to develop a new, interdisciplinary and critical theory of contemporary society, by drawing on the works of Hegel, Marx, Nietzsche, Freud and Weber (see Jay, 1973, and Wiggenhaus, 1995, for overviews). The Frankfurt School reflected on the limits of claims made for certain kinds of knowledge. They used their analyses to question the foundations of knowledge and science, as practiced in modern society. In particular, they pointed out that contemporary society was filled with repressive and inhuman mechanisms that distorted or alienated people. For these critical theorists, political liberalism can be decadent, and science the instrument of political oppression. In short, critical theorists believed it was important to use their knowledge to criticize the status quo and promote radical change.

Members of the Frankfurt School were engaged in a project that sought to specify the ways in which the community we belong to influences the way we perceive and understand the world. Individual members of the School disagreed about how, and through which mechanisms, society influences its members in practice. They also quarrelled about whether individuals, in turn, affect the nature of society. Some held that individuals constantly (re)created society through their patterned behaviour; while others held that changes occurred from the self-conscious and wilful acts of reform, rebellion or revolution. But they all embraced the basic notion of individuals as carriers, and societies as pools of knowledge.

Though students are sometimes loath to admit it, social scientists are people too. They are members of society and are, like everybody else, influenced by the society in which they live and work.

The Role of Ideas

Our discussion brings us to the third framing device found in Whewell: the role of ideas. Whewell was well aware of the complex ways that facts and ideas could relate to one another, and he summarized his main argument as an aphorism on one of the very first pages in the first volume of *The Philosophy of the Inductive Sciences*:

> *Fact* and *Theory* correspond to Sense on the one hand and to Ideas on the other, so far as we are *conscious* of our ideas: but all Facts involve Ideas *unconsciously*; and thus the distinction of Facts and Theories, is not tenable, as that of Sense and Ideas is. (Whewell, 1996 [1840], p. xvii, emphasis in original)

A few pages later, he reiterates the point: 'Facts are the materials of science, but all Facts involve Ideas' (1996, p. xxxvii). In other words, human knowledge comes from sense perception, yet scientific knowledge hinges on more than perception alone. Perception is conditioned by ideas. Without ideas we cannot make sense of the things our senses bring to us. Ideas perform a crucially important role in guiding the flux of sensory impressions as they enter the mind. Consequently, our knowledge of the world depends on the way in which ideas affect our perceptions – how they are evaluated, discussed and strung together. Perception is not the result of lenses alone: 'People, not their eyes, see. Cameras and eyeballs are blind,' Norwood Hanson (1958, p. 6) reminds us.

Science is more than the collection of reams of facts. It also involves the creative organization, interpretation and assessments of those facts. Whewell claimed that the naturalist tradition undervalued these other aspects of science: routinely overlooking the role played by individual inspiration and scholarly imagination, and ignores the important role that ideas play in creating scientific knowledge.

For Whewell, the decisive act of scientific discovery involves the 'colligation' of facts. Good science relies on both facts and ideas. But Whewell draws this argument out even further by arguing that a good idea eventually becomes incorporated into experience. When an idea is convincing enough, it becomes so tightly integrated into experience that we come to think of it as a fact. By Whewell's account, yesterday's theories become the facts of today. The facts of today (for example, that the Earth revolves around the sun), began as yesterday's ideas. Our susceptibility to facts is framed by ideas, readily available in the pool of common knowledge.

This claim is intimately related to the concept of foreknowledge – a concept that flies in the face of the inductivist position of the naturalist methodology, described in Chapter 2. Foreknowledge, it must be noted, is not bias. For the constructivist, foreknowledge is both necessary and integral to any research project. Thus, right from the start, the hermeneutic approach assumes that we form an expectation about the unknown from what we already know. Diesing (1992) suggests that foreknowledge must be made explicit and formulated as an initial hypothesis:

> The initial hypothesis guides the search for and interpretation of details, which in turn revise the hypothesis, which leads to reinterpretation and further search, and so on. In case of conflict, the circle tends to widen farther and farther into the contexts on the one side and our foreknowledge on the other side. (Diesing, 1992, p. 109)

This circular or dialectical aspect of constructivist science is one of its characteristic features. It is also its main point of criticism. This dialectical approach tries to explain something (x) in terms of something else (y), before turning around and explaining y in terms of x. In short, there is no clear verification principle on which we can fall back: we can only continue to offer competing interpretations. Aware of this problem, proponents of this approach argue that it is the most honest. Our understanding of the world is not based on a secure ontological starting point: it is circular in nature. Indeed, Otto Neurath (1959, p. 201) once likened it to the problem to repairing a faulty boat at sea: 'We are like sailors who must rebuild their ship on the open sea, never able to dismantle it in dry-dock and to reconstruct it there out of the best materials.'

Teutonic Treatments: Verstehen and Hermeneutik

It is easy to see how Whewell's argument lends itself to the concept of *verstehen* – a concept associated with an important branch of modern social research. The concept of *verstehen* is a shoot from the Kantian root, tended and groomed by German gardeners such as Wilhelm Dilthey, Heinrich Rikert, Georg Simmel and Max Weber.

At the very start, Dilthey (1833–1911) maintained that understanding is an outcome of *empathy* – that in order to understand an action or an argument, it is necessary to put oneself in the agent's (or author's) shoes, relive her experiences and image oneself in her social location, as it were. Our attempt to tap into Kikki Rouget's empathetic knowledge of her husband (in Chapter 7) is an example of this sort of understanding.

Eventually, Dilthey distanced himself from this approach because he saw that it might easily lead down the path to subjectivism, at the end of which loomed the threatening ghost of relativism. Because, if all our perceptions are phenomenal, and all knowledge is personal, then there is no guarantee that different observers have a common knowledge of the world. It becomes hard to assess whether you and I (and the woman next door) understand the same thing when we refer to trust, marriage, power, deceit and so on.

Dilthey needed to find a way to show that some understandings are truer than others; and that some propositions are good and others are bad. To do this, he invoked the ancient technique of *hermeneutic understanding* – an old and recognized procedure of the interpretation of texts, particularly biblical texts, whereby any understanding must be shown to fit a distinct context. The first hermeneuticians were theologians, and for them the privileged position was granted an omniscient God: Hermes carried God's messages, and the art of reading those messages was thus labelled 'hermeneutics'. God has since retreated from the sciences – as we noted in the previous chapter. Yet the notion of a privileged position remains.

Hermeneutic understanding offered Dilthey a way to do two things. First, it could separate the natural from the human sciences – the *Naturwissenschaften* from the *Geisteswissenschaften*. Natural science hinges on *erklären*: it seeks to explain natural phenomena in terms of cause and effect. The human sciences (and the budding social sciences) involve *verstehen*: they seek to understand social phenomena in terms of relationships.

Second, hermeneutics offered Dilthey an independent perspective from which the human and social sciences could privilege knowledge – in other words, to sort good understanding from bad. This independent perspective can be obtained by interpreting particular passages by reference to the larger whole. As we learn from Outhwaite (1975, p. 34), Dilthey argued: 'The totality of a work must be understood through its individual propositions and their relations, and yet the full understanding of an individual component presupposes an understanding of the whole.' This constant movement between the whole and its parts is the famous 'hermeneutic circle', which Dilthey calls 'the central difficulty of the art of interpretation'.

By this move, Dilthey made hermeneutics philosophical. Suddenly it was no longer a didactic aid for other disciplines. The old question, 'How to read?' was pushed aside by the much broader question: 'How do we communicate at all?' This question invited a philosophical discussion about understanding symbolic communication as such, and several social scientists responded. Dilthey's distinction between explanation and understanding was elaborated by sociologists such as Max Weber. His hermeneutic approach was pursued by sociologists and social philosophers – most famously by his student, Martin Heidegger, and Heidegger's student, Hans-Georg Gadamer (1900–2002).

For Gadamer, knowledge is not about providing universal truths, but about expanding our own horizons and understanding. We do this by examining life as a product embedded in culture, and reflecting practical activity. Understanding is based on a feeling for the individuality and uniqueness of people; it is a way to understand the inwardness of the other (Gadamer, 1984, p. 57). Thus understanding a text does not involve recovering the author's original intention; rather, it is a matter of encountering a text from one's current position in time:

> every age has to understand a transmitted text in its own way, for the text is part of the whole tradition in which the age takes an objective interest and in which it seeks to understand itself. The real meaning of a text, as it speaks to an interpreter, does not depend on the contingency of the author and whom he originally wrote for. (Gadamer, quoted in Gunnell, 1982, p. 317)

In short, the meaning of each particular item comes from its place in the whole. For example, if we want to know the meaning of a particular word or phrase in a sentence, we often use the context of the sentence (or paragraph, or section, or piece) to understand what is meant. To understand the meaning of a piece, we can also place it in its larger context. As Gadamer (2002, p. 291) put it (with reference to the work of Friedrich Schleiermacher, a German theologian and philosopher), 'as the single word belongs in the total context of the sentence, so the single text belongs in the total context of the writer's work'.

The same sort of interactive method can be used to interpret social phenomena. In one interpretation of this method, the researcher starts with an initial proposition and projects it on to a particular context. He probes it for suitability and then returns to the proposition with an assessment of goodness-of-fit and notions of how to reformulate the original proposition (which in turn leads to another reinterpretation and a further search, and so on). The common hermeneutic strategy of 'tacking' back and forth between the particular and the general allows the researcher to develop a more flexible relationship with her subject.

Anglo-American Formulations: Structures and Institutions

For the British sociologist, Anthony Giddens (1982), this sort of tacking is similar to the naturalist notion of hypothesis testing. For him, however, such testing is not enough. Like many constructivists, Giddens calls for yet another level of hermeneutic understanding, one which he referred to as the 'double hermeneutic'.

At the first hermeneutic level, 'history matters'. Karl Marx (1852) hinted at this first-level understanding in a famous observation that 'human beings make their own history, but not in circumstances of their own choosing'. Giddens (1984) explores the full importance of Marx' aphorism in his theory of 'structuration', explaining that all human action is carried out within the context of a preexisting social structure governed by a set of norms and rules that are distinct from those of other social structures. Therefore, all human action is to some degree predetermined by the contextual rules under which it occurs. However, the structure and rules are not permanent. True, they are sustained by human action; but they are – at the same time – constantly modified by human action in complex processes of feedback. At the core of Giddens' concept lies the notion that social actors create and recreate the social structures they inhabit.

This understanding of the relationship between humans and society creates difficulties for social scientists, for at least two reasons. First, social scientists (unlike scientists who study the natural world) are members of the society that they study, therefore they can't observe the world from an external point of view. Second, they observe a social world that is already being interpreted by other actors who also inhabit it, and on whose observations the scientific observers are forced to rely.

As social actors we have the capacity to understand and respond to our analyses; thus our knowledge of the social world can actually affect that world. Indeed, it affects it in two ways. This is where the second hermeneutic level comes in: as a description of the two-tiered, interpretive and dialectical relationship between social scientific knowledge and human practice, where social analysts are part of the social world that they analyze.

This second-level understanding has been given a famous description in C. Wright Mills' notion of the 'cultural apparatus'. For Mills, our knowledge is greater than the simple sum of our observations: 'No man stands alone directly confronting a world of solid fact. No such world is available' (Mills, 1970 [1959], p. 405). Echoing the Kantian themes of Whewell, Mills notes that our knowledge of the world is provided by observers we have never met – and will never meet. Indeed, most of what we think of as solid fact is provided to us by others. Hence, all our knowledge is secondary. In fact, we all live in 'secondary worlds'.

What does this mean, exactly? Does it mean that human beings form the world in which they live? Or does it mean that consciousness in humans is formed by the world around them? For Mills, the answer is neither.

> The consciousness of men does not determine their material existence; nor does their material existence determine their consciousness. Between consciousness and existence stand meanings and designs and communications which other men have passed on – first in human speech itself and, later, by the management of symbols ... They provide the clues to what men see, to how they respond to it, to how they feel about it, and to how they respond to these feelings. Symbols focus experience; meanings organize knowledge, guiding the surface perceptions of an instant no less than the aspirations of a lifetime.
>
> ... For most of what he calls solid fact, sound interpretation, suitable presentations, every man is increasingly dependent upon the observation posts, the interpretation centers, the presentation depots, which in contemporary society are established by means of what I am going to call the cultural apparatus. (Mills, 1970, p. 406)

A vast, 'cultural apparatus', then, stands between individual humans and the world. It is the lens through which we (think we) see the world.

Gallic Contributions: structures quotidien and habitus humaine

French historians also probed this kind of reasoning during the early 1930s. Their main venue was the journal *Annales d'histoire économique et sociale*. Its imaginative editors and authors – foremost among whom were Marc Bloch and Lucien Febvre – enriched their understanding of past events by combining history with geography, sociology, collective psychology and other social sciences. In the process they produced a distinctive approach to the past that was often referred to as 'the *Annales* School'. These historians were less interested in topics such as war and high politics than in social groups and cultural history, and in collective attitudes and widespread world views of the past. Bloch (1973 [1924]), Febvre (1983 [1942]) and others referred to these studies as 'history of mentalities' (*histoire des mentalités*).

One of the most influential expressions of this basic idea comes from the *Annaliste* historian, Fernand Braudel, in the first volume of his magisterial study on the evolution of early capitalism – in a volume entitled, *Les structures du quotidien* [The Structures of Everyday Life]. Here Braudel showed how the lives of most sixteenth-century people consisted of routine behaviour. Over time, this routinized behaviour came to have diverse effects on people: imprisoning some, while giving meaning to the lives of others. Braudel argues that this still applies. With a nod to Hume and his concept of 'habit', Braudel writes:

> I think mankind is more than waist-deep in daily routine. Countless inherited acts, accumulated pell-mell and repeated time after time to this very day become habits that help us live, imprison us, and make decisions for us throughout our lives. These acts are incentives, compulsions, ways of acting and reacting that sometimes – more frequently than we might suspect – go back to the beginnings of mankind's history. Ancient, yet still alive, this multicenturied past flows into the present like the Amazon River pouring into the Atlantic Ocean of the vast flood of its cloudy waters. (Braudel, 1977, p. 7)

The basic notion of the *Annalistes* – and in particular Braudel's idea of the 'structures' of everyday life – has been developed in many ways by many authors. Some of them follow Braudel and investigate the formative impact of material routines of daily work – Michel de Certeau (1980), for example, who relies on the concept of 'practice'. Others direct their attention toward patterns of social relationships – for example, Pierre Bourdieu (1977) who, with a nod to Hume, has coined the concept of 'habitus'. Still others explore the more abstract exchange acts or patterns of thought and speech – such as Michel Foucault (1972), who reintroduced the concept of 'discourse'.

'Practice', 'habitus' and 'discourse' are not synonymous concepts. For Braudel and de Certeau, 'practice' involves countless inherited acts that are repeated in everyday routines and accumulated over time – they become habits that both give order to our lives and imprison us. For

Bourdieu (1977, p. 72), 'habitus' denotes a form for intersubjectivity or socialized subjectivity or 'the internalization of externality and the externalization of internality'. For Foucault, human beings do not recreate society through their behaviour as much as through their 'discourse' – that is, through the routine use of everyday language that constantly re-presents society, thereby maintaining it. For Foucault (for example, 1978, p. 12), then, 'discourse' maintains 'systems of thought' composed of terms, concepts, ideas, beliefs and practices that systematically (re)construct the subjects and the worlds of which they speak. Foucault's approach is consistent with Kant – indeed, he relies on Kant for some of his concepts. But Foucault also pushes the argument by gauging its social and political implications. Discourses, Foucault argues, serve to preserve society and legitimate power relations.

Discourses, then, connect language to knowledge and power, and through power to politics. Statesmen and nation-builders use discursive mechanisms to shape and mould their citizens. They use schools, hospitals, prisons, military camps and other institutions to socialize and discipline their citizens, to mould systematically the mentalities of the nation. The stated goal of the government is to maintain a well-ordered and happy population. Foucault argues that the actual effect is to produce citizens who are suited to fulfilling the government's policies. This practice is a widespread 'art of government' in modern societies – especially in liberal democracies or neo-liberal societies. Foucault (1991) coined the term 'governmentality' (*gouvernementalité*) to label this mode of governing.

Constructivists – be they French, Anglo-American or German – emphasize the part that the surrounding community plays on the way we perceive and understand the world around us. However, they disagree markedly about the nature of this influence. Some (such as Marx) portray the relationship between human agents and social structures as a simple dialectic; while others depict it by using the more complex arguments of a double dialectic (Dilthey or Mills, for example). Some (such as Giddens and Braudel) seek to capture this relationship through the concept of structure, while others (Gadamer and Bourdieu, for example) doubt the notion of lasting but latent structures and prefer to see this influence in terms of strategic or (re)constitutive acts. These authors are often influenced by theories of communication and language, our fourth framing device.

On Communication and Language

As we have already noted, scientists live in society and must relate to all kinds of people, among them, their fellow-scientists. In doing so, scientists read and review one another's writings; they discuss procedures and results; and they exchange facts and ideas. In short, they communicate, and their communication is mediated by language. Whewell was aware of the importance of language in science, and began his *The Philosophy of the Inductive Sciences* with a discussion 'concerning the language of science'.

Later, Thomas Kuhn elaborated on Whewell's claims about language and wove them into a more systematic discussion. In doing so, Kuhn took Whewell's arguments a long step further. For example, Kuhn did not just recognize that the distinction between fact and theory was unclear; he also argued that facts are theory-dependent – they are only meaningful in relation to some theory. In addition, Kuhn introduced a new and troublesome twist: he argued that facts are language-dependent. This threw an enormous wrench in the naturalist machinery. If facts are language-dependent, then so too is the world (as the world is composed of facts).

Following Kuhn, we find ourselves in a reality that cannot exist independently of language. Of course, Kuhn was not the first to make this connection. Members of the Vienna Circle also discussed the role of language – indeed, Alfred Ayer's (1952 [1936]) influential introduction to Logical Positivism was entitled *Language, Truth and Logic* (emphasis ours). The positivists, however, did not probe such questions deeply; this would have drawn them too far away from their focus on truth and logic. For the naturalists, language is partly a tool through which observations and knowledge are expressed, and partly a transparent medium that preserves the vast body of human knowledge.

For the constructivists, by contrast, language is much more. We have already noted how Kant influenced Whewell. We should add that Kant also influenced German idealists such as Johann G. Herder and Wilhelm von Humboldt, who argued that language is more than a transparent medium of communication; language affects the way we look at the world. Anthropologists have, in turn, relied on Herder and Humboldt to explain how vocabulary and grammar shape thought. One of the most celebrated of these explanations is formulated by one of Franz Boas's star students: Edmund Sapir (1906). Sapir claimed that language not only affects thought, but it also affects perception and cognition. One of Sapir's students, Benjamin Lee Whorf, went on to become a fire insurance investigator and relied on this claim when he wrote 'Blazing Icicles' – an unpublished yet legendary report which demonstrated how semantic misunderstandings led to a number of easily preventable fires.

For Sapir and Whorf, human thought and action were shaped by language and society (Whorf 1956 [1940]). Their claims – that speakers of different tongues think and observe the world differently – were greeted with much excitement in the 1930s and 1940s. Enthusiasm wore off, however, when no evidence was found to support the basic claims. By the

1970s, social scientists had become disenchanted with the Sapir–Whorf hypothesis. It was all but abandoned when two novel approaches emerged on the scene. First, there were new postmodernist elaborations – such as the claim that language is encased in conventions which are products of discursive practices that systematically (re)construct the subjects and the worlds of which they speak (Foucault, 1970, 1972; Shapiro, 1984; White, 1987; but see also the caustic essays by Pullum, 1991). Second, there was new evidence from cognitive psychology – for example, that people who speak languages that rely on absolute directions develop an uncanny sense of direction, and that people who think differently about space also tend to think differently about time (Boroditsky and Gaby, 2010).

The Linguistic Turn

For the constructivist, language does not merely concern the relationship between the observer and what is being observed; it involves the whole of society. Indeed, for some constructivists, language makes possible those acts of communication that constitute human society. But what kind of relationship is this? What does communication entail? How does it happen? And how does it relate to society? The major contributors to the naturalist tradition – Locke, Hume, Mill and the members of the Vienna Circle – are curiously silent on these questions. Naturalism simply assumes that observations are written down and disseminated to others in a neutral, or instrumental, fashion. But over the years there have been many rebel forces launching linguistic offensives against this aspect of the naturalist camp.

There has been no single, unified philosophical movement or a particular linguistic impulse behind these offensives; what we find instead is a plethora of guerrilla snipers. Thus it is hard to get a proper handle on the nature of this linguistic turn. However, to simplify the discussion, we can distinguish between two kinds of influences: a formalist approach to linguistics that originated in Eastern Europe toward the end of the nineteenth century; and a structuralist social philosophy that emerged in France.

The formalist approach can be traced to two ideas of the Swiss philologist, Ferdinand de Saussure (1857–1913). The first idea is that there is not necessarily a relationship between words and things; and the second is that language is made up of much more than just words.

Saussure's first idea comes from Immanuel Kant. If we point to a tree and say 'There is a tree', most people would make an immediate connection between the word and the thing in the world we call a 'tree'. However, Saussure did not; he argued that to assume that words point to things is to assume that the objects in the world present themselves

to us pre-digested, as it were. Kant had explained that this was not the case. He had argued that when we observe things in the world, the human mind takes in the sense impressions and then begins to work actively with them and to fashion the impressions into recognizable objects. According to Saussure, Kant's theory suggests that the human mind performs two functions: it forms a sense impression into an image and determines that the image thus constructed is separable from all the other shapes and colours around it. These two mental functions are the key points for Saussure's analysis.

Saussure's second idea was entirely his own: that words are the elemental units of language, but a language is much more than a selection of words cobbled together. This idea, that a language is more than the sum of its individual components (words), implies that there is an underlying principle determining interrelationships among words. This principle affects the form that individual words assume (for example, whether they are conjugated or declined according to tense, case, number or gender).

Saussure drew a sharp distinction between words (*paroles*) and language (*langue*). A language, he argued, contains two different things: words and the principles that direct their use. The first component, the word, has no natural relationship to any object in the world. The second component – the principles which specify the usage of the word – Saussure called 'the structure' of a given language, and it is this structure that gives a word its meaning. The implications of Saussure's idea fired imaginations far beyond his own discipline.

In the wake of the First World War, this claim revolutionized the study of language everywhere. In America, linguists such as Leonard Bloomfield embraced Saussure's notion of 'structure' to develop a new science of 'structural linguistics'. In Europe, similar developments were nursed by Louis Hjelmslev in Denmark and Antoine Meillet in France. Most significantly, Saussure made an enormous impression on Russian and Eastern European linguists. In Russia, Saussure stimulated a distinct school of linguistic formalism which influenced thinkers such as Mikhail Bakhtin. In Prague, Roman Jakobson and Nikolai Trubetzkoy pursued Saussure's notion that the meaning of a word is determined not by its content but by its placement – 'not by what it contains but by what exists outside of it' (Saussure, 1986 [1916], p. 114). This so-called Prague School developed a now standard theory in linguistics, where the inventory of sounds in a particular language could be analyzed in terms of a series of contrasts or opposites. The Prague School also contributed to the electrifying effect that Saussure's imagery had on scholars in other fields.

Around the time of the Second World War, the notion of structure began to animate the social sciences. In France, the anthropologist

Claude Lévi-Strauss applied Saussure's discussion about *langue* and *parole* in his ambitious, Kant-like search for the basic structures of the human mind. A Jew, Lévi-Strauss fled France during the war, spending most of the war years among a community of intellectual émigrés in New York City. Here he met Franz Boas, Roman Jakobson and others who inspired him to search for the formal codes and universal mental structures that he believed lay beneath all myth and kinship relations. Lévi-Strauss was particularly interested in patterns associated with parenthood and family relations (*The Elementary Structures of Kinship*, (1969 [1949]); in totem mentalities (in *La pensée sauvage*, 1962) and primitive myths (first in *Mythologiques*, 1964–71, and later in particular myths associated with different eating habits, for example, *The Raw and the Cooked* (1979 [1964]), and *From Honey to Ashes* (1973 [1967]). In these studies, Lévi-Strauss examined social relationships with an eye to uncovering the underlying structure of societies.

(Before turning to explain the title of this subsection, we want to draw attention to the fact that the New York encounter between Franz Boas and Lévi-Strauss was full of tragic symbolism. Apparently, while meeting Lévi-Strauss for lunch at Columbia University's Faculty Club on 21 or 22 December 1942, the 84-year-old Boas collapsed and fell from his chair. Lévi-Strauss tried to revive the fallen Boas, but he died of a heart attack in the Frenchman's arms. The details of this tragic lunch are both fuzzy and contested (see, for example, Lowie (1947).) We learned of this story in an internet post from Dan Everett (2009), who provides us with a fitting epitaph to this section. When Boas collapsed that day in the arms of the young founder of French anthropology 'Lévi-Strauss assumed from his fallen colleague the symbolic mantle of leadership, becoming the most important living anthropologist of the twentieth century, a distinction he maintained for another 67 years').

Now back to our story. The title of this section, 'The Linguistic Turn', is a reference to an influential book from 1967 with the same title, edited by Richard Rorty. In the decades that followed, work in the humanities and social sciences increasingly recognized the importance of language in framing the way we see and interpret patterns in the world. This linguistic turn paralleled other developments in a broader structuralist movement, which searched for underlying patterns and regularities upon which meanings rested. Though individual members were reticent about being associated with it, the structuralist movement often attracted individuals of a radical persuasion, especially in France, where it was associated with radical Marxists such as Louis Althusser and Nicos Poulantzas.

While structuralism allowed its followers to distance themselves from the normative framing that accompanied Western academia, it did so at the cost of local knowledge. This is a tremendous liability for most constructivists. Indeed, the structuralist's willingness to distance herself from historical and contextual reference points produced a backlash in the form of post-structuralism (as associated with people such as Julia Kristeva and Jacques Derrida). Post-structuralists reintroduced the importance of culture and context in understanding a text or social situation. Typically, post-structuralists hold that the meaning of any work is itself a cultural phenomenon.

Recapitulation: A Constructivist Way of Knowing

In this chapter we have tried to portray an alternative approach to social study, a competitor to naturalism. The portrait we have painted is sketchy, and made with broad strokes. Nevertheless, we hope to have captured some of constructivism's most distinctive features. In doing so, we have granted Immanuel Kant a central role in the constructivist tradition. As a consequence of the ambiguous and contentious nature of Kant's arguments, they continue to influence the nature of contemporary debates about what constitutes science.

We have swept quickly through a wide swath of the Western world's academic history – from historical authorities such as Kant and Whewell, to the many interwar intellectuals who fled the rise of fascism in Europe, to even more recent authorities on discussions about context and meaning. At first glance, it appears difficult and daunting to unify this disparate and varied group of thinkers under any single methodological claim. We realize that the diversity of these thinkers makes it difficult to find among them any single ontological claim, any uniform epistemological vision, or any particular methodological stance. Indeed, we worry that many constructivists will balk at the idea of trying to unify such diverse thinkers as Kant, Kristeva and Kuhn. But we take some comfort in the fact that the same thing could be said of scholars from the naturalist camp. After all, both traditions are diverse; the difference between them is more a matter of degree than of nature.

At a pinch, we are prepared to argue that the naturalist camp is the less diverse of the two. The vast majority of naturalist scientists are willing to share a small handful of philosophical assumptions – for example, they agree that there is Real World out there, and that scientists have access to it through their senses. In contrast, it is more difficult to reach a consensus among constructivists on any given ontological or epistemological position. While many constructivists would accept that social scientists do have access to a Real World by way of their senses, many others question the existence of that World. Still others would argue that there is a Real World, but that neither perceptions nor human reason allow us guaranteed access to it, as it is buried under so many layers of conceptual and contextual meaning (many, many turtles down). In short, the constructivist camp covers much territory, and as a consequence it may house a more heterogeneous group of fellow travellers than the naturalist camp.

If we are to discuss the constructivist camp at all, however, it is necessary to provide it with some unifying properties – if only to help us juxtapose this tradition with that of naturalism described in the first part of the book. Such unifying properties do exist; the problem is that they are distributed unevenly among members of the constructivist camp. To understand and depict these unifying characteristics we might think of them in terms of Wittgenstein's (1999, §§ 66–71) reference to 'family resemblances': a set of features that are recognized as being similar, but which have no single thing in common.

The Constructivist Other

Family photographs depict a group of individuals who share noticeable traits. That is not to say that every member of the family shares one or two dominant features; rather, they resemble each other in that they, together, on closer scrutiny, share a set of features distributed unequally among them. A few of the men may have the same big ears, some of the women may have the same thick neck, some (both men and women) may have the same kind of blunt nose, others may share the same mass of black, straight hair, and so on. But, compared to the physical characteristics shared by other families, it is possible to distinguish a family resemblance. It is in these ways that we can think of the family of constructivist social scientists: we recognize that no single methodological feature is shared by every member of the constructivist troop, but some features are shared by some of the members in a way that distinguishes them from other methodological families.

One of the most commonly held family features in the constructivist camp is a deep scepticism of the naturalist approach to social science. This takes aim at the core ontological, epistemological and methodological claims of the naturalist tradition. As this scepticism is broadly shared, residents of the constructivist camp might be construed as a collective Self by virtue of their common opposition to a naturalist Other.

At the end of Chapter 2 we identified three broad joists that sustain the naturalist tradition – the notion that the Real World exists; that this world is a realm of independent particulars that relate to each other in regular and patterned ways; and that humans have access to this world through systematic observation. In Figure 8.1 we identify three basic

Figure 8.1 ***The three basic joists of constructivist social science***

- An *ontology* based on the precepts that women and men are malleable, and that each of us participates in the construction of our own world.
- An *epistemology* which, in addition to sense perceptions and human reason, relies on a much broader repertoire of epistemological devices (such as empathy).
- A *methodology* which seeks to identify socially constructed patterns and regularities.

joists in the constructivist tradition. It is important to note that none of these joists were hewn from the trunk of the natural sciences. In fact, all three were developed in self-conscious opposition to naturalism. It is this opposition to the naturalist tradition that is perhaps the most important single feature that can unify the disparate constructivist camp.

The first joist is *ontological*. Constructivists convey a basic uncertainty about the nature of the world. For them, the world does not exist independently of our senses; it is a world of appearances. More to the point, the world we study is one that appears to people who find themselves situated in different contexts. Consequently, the world appears differently to different people; its appearance varies with the contextual setting (temporal, geographical, engendered, ideological, cultural and so on) of the observers.

This constructivist ontology is at odds with the one shared by empiricist philosophers such as John Locke and David Hume in at least two important ways. First, constructivists do not eagerly embrace the naturalist notion of a Real World. Rather, they tend to argue that the world is a human construction. Second, constructivists harbour a deep suspicion toward Locke and others who endow humans with fixed and permanent attributes. Constructivists are not fond of invoking human nature; they tend to portray human beings as adaptable and malleable creatures.

In short, the common point of departure for most constructivists is an agreement that the naturalist tradition provides an unsatisfactory basis for social science. On this point, constructivists tend to distance themselves from scientific realists, as we explained in Chapter 1.

Constructivists also agree that it is important to discuss and consider the nature of the relationship between the mind and its world. For as long as this relationship remains unsettled, constructivists and naturalists cannot agree about the source of the patterns that both traditions agree exist (and which cry out for explanation). Naturalists are familiar with Kantian arguments – they tend to sample them, feign polite interest in their basic tenets, and then move on quickly to more practical tasks. Constructivists, in contrast, tend to linger on these Kantian arguments. While many constructivists would agree that the physical world is material, concrete and given by nature, they are loath to accept the same description of the social world. For them, there is no clearly delineated single social world: there are many. None of these worlds are naturally given; all of them are socially constructed. Each world is created by human beings – not in the sense that humans consciously set about building their world from some original blueprint, but in the sense that this world has evolved as a result of human interaction in society, through history, with ideas, using language. Having said this, we should point out that constructivists disagree about how much of the naturalist philosophy we can and should keep. Also, they differ markedly on the distance they want to travel to find a more credible alternative.

This has significant consequences for the constructivist attitude toward truth. Given the ontological certainty of the naturalist approach, it is common to find naturalists who are firmly committed to uncovering real and unyielding truths about the world. While this commitment to singular truths can be found among some constructivist scholars, they generally tend to be more agnostic on issues of truth. To paraphrase Rorty (1979, p. 377), the point for many constructivists is to keep the conversation going rather than to find objective truth.

This brings us to the *epistemological* joist of constructivist science. Given the more open-ended ontological position shared by constructivists, we should not be surprised to find their epistemological joist to be of sizeable dimensions. Constructivists refuse to be limited to sensual perception and reason as the only means of accessing knowledge. Instead, they tend to embrace a much broader selection of epistemological devices, prioritizing those that protect, enhance and exploit contextual meanings.

In short, constructivists tend to be epistemological pluralists. They are willing to employ different tools to understand the unique nature of the social world. This willingness flows from two related claims. The first is ontological: that the natural and social worlds are different. The second is epistemological: that in order to obtain knowledge about the social world, it is necessary to break away from the mechanical notion than the whole is a simple aggregation of its parts: we need to understand how the parts relate to one another in the context of the whole. For the social sciences, knowledge is carried by individuals but anchored in collectives.

For the constructivist tradition, then, knowledge is not a subjective thing threaded through and through with relativism (as some of its critics charge). Knowledge is intersubjective. The world is real. It is an object – a *phenoumenon*, a thing-for-us – and we can obtain knowledge about it. But how do we do that? The short constructivist answer to this important question is: very carefully!

The reason for being so careful is related to the constructed nature of the social world. The truth isn't just 'out there'. Knowledge about the social world is always knowledge-in-context; it is socially situated and has social consequences. As a result, knowledge is always *somebody's* knowledge. It is, in Robert Cox's (1996, p. 87) famous formulation, '*for* someone'; it serves somebody's purpose. To 'know' is to be in a position to dominate or enslave.

Because knowledge and power are so closely associated, constructivists hold that it is necessary to approach knowledge with both scepticism and great self-awareness. We need to be attuned to the context in which knowledge is engendered, by whom and for what purpose. This suggests a more strategic relationship to epistemology (than we find among naturalists). We also have to approach knowledge with the proper attitude. For example, we need to consider knowledge in political solidarity with the more marginalized members of society or with the proper respect for (and empathy) with the object at hand. In short, constructivists approach the world and its knowledge *critically*.

But besides being careful and critical, how do constructivists approach the social world when they search for knowledge about it? Constructivists differ on this point. Some are pragmatic and argue that the question, the purpose and the sources at hand must determine the method: for example, sometimes statistical analyses and hypothesis testing is the way to go; and sometimes an interpretive narrative approach is the more natural choice. Others shun any procedural design that smacks of naturalism. Some constructivists have found in hermeneutics a basic method that dovetails nicely with the ontological and epistemological tendencies of constructivism. Our point is that constructivists often rely on the same basic methods as do naturalists, but they do so in different ways and toward different ends. This important lesson is elaborated on in the chapters that follow.

From these ontological and epistemological commitments we find a confirmation of the constructivists' *methodology*. Constructivists realize that the world is filled with repetitions and regularities, but they insist that these patterns are socially constructed, even as the world appears to us as objective fact. For this reason, constructivists approach their study with tools and approaches that can identify these socially-constructed patterns in the world, and understand them in the light of the contexts that give them meaning. Thus the focus of their inquiry is just as often the inquirer (and her context) as it is the particular object of inquiry – because it is here that the roots of these patterns lie buried.

Conclusion

In this chapter we have traced the constructivist approach back to David Hume, who jarred Immanuel Kant from his dogmatic slumber. As a consequence of this rude awakening, Kant produced a contentious, ambiguous and important argument that has kept entire philosophy departments busy for well over two centuries. Kant's argument about the human (in)ability to understand (directly) the Real World still lies at the heart of constructivist approaches today. Given Kant's reputation for opaqueness and obscurity, we have relied on William Whewell to shine a light on the key precepts of constructivist thought. Among these is the insightful recognition that our knowledge is framed by history, society, ideas and language.

Whewell's ideas took on a new urgency in the closing decades of the twentieth century. The result has been a varied and multifaceted approach to social science that shares certain ontological beliefs, but little else (except, perhaps, a common antagonism to the naturalist approach). This constructivist approach to social science is sceptical of the naturalist quest for truth and order; it is willing to embrace new epistemological outlets; and it is wary of rigid demarcation principles. As a consequence – and as we shall see in the chapters that follow – constructivists use social scientific methods in ways (and toward ends) that differ substantially from the naturalists'.

The constructivist's priority is to protect (historical, social, ideational and language-based) contexts, as these provide insight and meaning. While naturalists employ their hierarchy of methods to map the Real World's inherent patterns, constructivists use similar methods to map and explain the variance in patterns observed, and to zero-in on the nature of the explanations that link the observed patterns. In the chapters that follow we shall see familiar methods employed in new ways toward these constructivist ends.

We shall also see that it is more difficult to rank the methods employed by constructivists into any sort of hierarchy. While most constructivists have a soft spot for narrative approaches (as these provide scholars with a proximity to the data and context that is necessary to gain insight), constructivists also employ comparisons, statistics and even experiments. But they employ these methods in ways that are designed to protect, nurture and reveal the contexts and meanings that constructivists cherish, and/or to map and explain the different ways in which we come to see and understand our social world(s).

Recommended Further Reading

To begin at the beginning, read William Whewell's *History of the Inductive Sciences* (1967 [1837]) and his *The Philosophy of the Inductive Sciences* (1996 [1840]). Thomas Kuhn's *The Structure of Scientific Revolutions* (1970 [1962]), Peter Winch's *The Idea of a Social Science and Its Relation to Philosophy* (1958) and Ludwig Wittgenstein's *Philosophical Investigations* (1999 [1953]) are classic references. For more accessible introductions to the philosophy of constructivist science, see Berger and Luckmann's *The Social Construction of Reality* (1966) and John Searle's *The Construction of Social Reality* (1995).