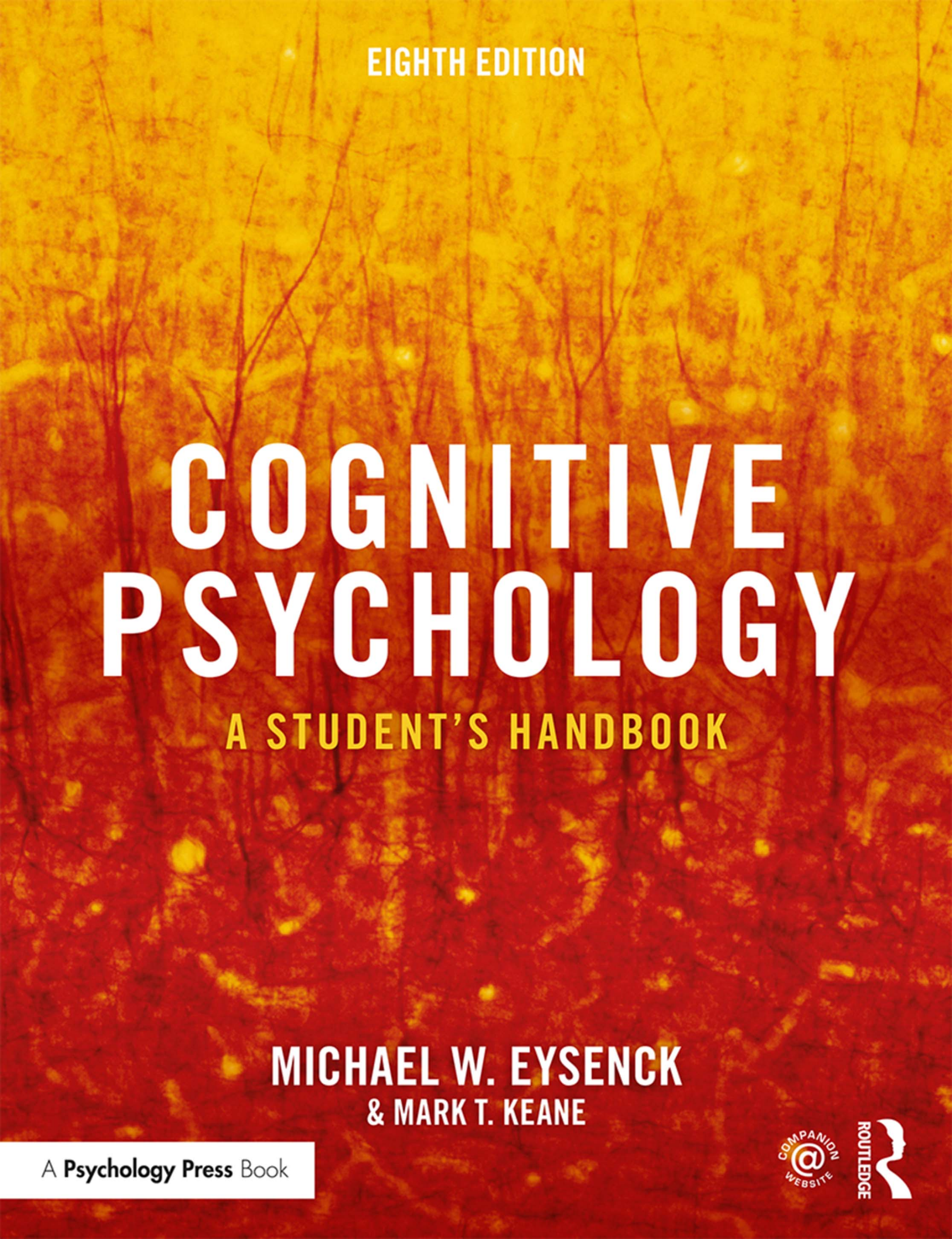

EIGHTH EDITION

COGNITIVE PSYCHOLOGY

A STUDENT'S HANDBOOK

MICHAEL W. EYSENCK
& MARK T. KEANE

A Psychology Press Book

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ROUTLEDGE

"This edition of Eysenck and Keane has further enhanced the status of *Cognitive Psychology: A Student's Handbook*, as a high benchmark that other textbooks on this topic fail to achieve. It is informative and innovative, without losing any of its hallmark coverage and readability."

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Cognitive Psychology

The fully updated eighth edition of *Cognitive Psychology: A Student's Handbook* provides comprehensive yet accessible coverage of all the key areas in the field ranging from visual perception and attention through to memory and language. Each chapter is complete with key definitions, practical real-life applications, chapter summaries and suggested further reading to help students develop an understanding of this fascinating but complex field.

The new edition includes:

- an increased emphasis on neuroscience
- updated references to reflect the latest research
- applied 'in the real world' case studies and examples.

Widely regarded as the leading undergraduate textbook in the field of cognitive psychology, this new edition comes complete with an enhanced accompanying companion website. The website includes a suite of learning resources including simulation experiments, multiple-choice questions, and access to Primal Pictures' interactive 3D atlas of the brain. The companion website can be accessed at: www.routledge.com/cw/eysenck.

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COGNITIVE PSYCHOLOGY

A Student's Handbook

Eighth Edition

MICHAEL W. EYSENCK
AND MARK T. KEANE

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To Christine with love
(M.W.E.)

What moves science forward is argument, debate,
and the testing of alternative theories . . . A science without
controversy is a science without progress.
(Jerry Coyne)

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Preface

Producing regular editions of this textbook gives us a front-row seat from which to observe all the exciting developments in our understanding of human cognition. What are the main reasons for the rapid rate of progress within cognitive psychology since the seventh edition of this textbook? Below we identify two factors that have been especially important.

First, the overarching assumption that the optimal way to enhance our understanding of cognition is by combining data and insights from several different approaches remains exceptionally fruitful. These approaches include traditional cognitive psychology; cognitive neuropsychology (study of brain-damaged patients); computational cognitive science (development of computational models of human cognition); and cognitive neuroscience (combining information from behaviour and from brain activity). Note that we use the term "cognitive psychology" in a broad or general sense to cover *all* these approaches.

The above approaches all continue to make extremely valuable contributions. However, cognitive neuroscience deserves to be singled out – it has increasingly been used with great success to resolve theoretical controversies and to provide novel empirical data that foster theoretical developments.

Second, there has been a steady increase in cognitive research of direct relevance to real life. This is reflected in a substantial increase in the number of boxes labelled "IN THE REAL WORLD" in this edition compared to the previous one. Examples include eyewitness confidence, mishearing of song lyrics, multi-tasking, airport security checks and causes of plane crashes. What is noteworthy is the increased *quality* of real-world research (e.g., more sophisticated experimental designs; enhanced theoretical relevance).

With every successive edition of this textbook, the authors have had to work harder and harder to keep with huge increase in the number of research publications in cognitive psychology. For example, the first author wrote parts of the book in far-flung places including Botswana, New Zealand, Malaysia and Cambodia. His only regret is that book writing has sometimes had to take precedence over sightseeing!

We would both like to thank the very friendly and efficient staff at Psychology Press including Sadé Lee and Ceri McLardy.

We would also like to thank the anonymous reviewers, that commented on various chapters. Their comments were very useful when we embarked on the task of revising the first draft of the manuscript. Of course, we are responsible for any errors and/or misunderstandings that remain.

Michael Eysenck and Mark Keane

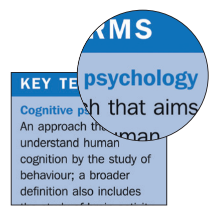
Visual tour (how to use this book)

TEXTBOOK FEATURES

Listed below are the various pedagogical features that can be found both in the margins and within the main text, with visual examples of the boxes to look out for, and descriptions of what you can expect them to contain.

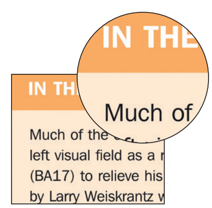
Key terms

Throughout the book, key terms are highlighted in the text and defined in boxes in the margins, helping you to get to grips with the vocabulary fundamental to the subject being covered.



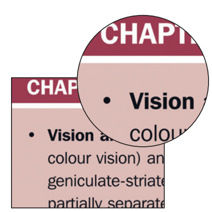
In the real world

Each chapter contains boxes within the main text that explore "real world" examples, providing context and demonstrating how some of the theories and concepts covered in the chapter work in practice.



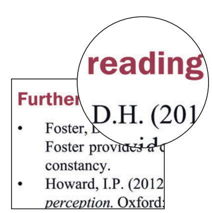
Chapter summary

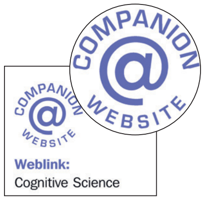
Each chapter concludes with a brief summary of each section of the chapter, helping you to consolidate your learning by making sure you have taken in all of the concepts covered.



Further reading

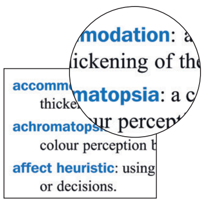
Also at the end of each chapter is an annotated list of key scholarly books, book chapters, and journal articles that it is recommended you explore through independent study to expand upon the knowledge you have gained from the chapter and plan for your assignments.





Links to companion website features

Whenever you see this symbol, look out for related supplementary material amongst the resources for that chapter on the companion website at www.routledge.com/cw/eysenck.



Glossary

An extensive glossary appears at the end of the book, offering a comprehensive list that includes all the key terms boxes in the main text.

Chapter 1

Approaches to human cognition

INTRODUCTION

We are now well into the third millennium and there is ever-increasing interest in unravelling the mysteries of the human brain and mind. This interest is reflected in the substantial upsurge of scientific research within cognitive psychology and cognitive neuroscience. In addition, the cognitive approach has become increasingly influential within clinical psychology. In that area, it is recognised that cognitive processes (especially cognitive biases) play a major role in the development (and successful treatment) of mental disorders (see Chapter 15).

In similar fashion, social psychologists increasingly focus on **social cognition**. This focuses on the role of cognitive processes in influencing individuals' behaviour in social situations. For example, suppose other people respond with laughter when you tell them a joke. This laughter is often ambiguous – they may be laughing with you or at you (Walsh et al., 2015). Your subsequent behaviour is likely to be influenced by your cognitive interpretation of their laughter.

What *is* cognitive psychology? It is concerned with the internal processes involved in making sense of the environment and deciding on appropriate action. These processes include attention, perception, learning, memory, language, problem solving, reasoning and thinking. We can define **cognitive psychology** as aiming to understand human cognition by observing the behaviour of people performing various cognitive tasks. However, the term "cognitive psychology" can also be used more broadly to include brain activity and structure as relevant information for understanding human cognition. It is in this broader sense that it is used in the title of this book.

Here is a simple example of cognitive psychology in action. Frederick (2005) developed a test (the Cognitive Reflection Test) that included the following item:

> A bat and a ball cost $1.10 in total. The bat costs $1.00 more than the ball. How much does the ball cost? ___ cents

KEY TERMS

Social cognition
An approach within social psychology in which the emphasis is on the cognitive processing of information about other people and social situations.

Cognitive psychology
An approach that aims to understand human cognition by the study of behaviour; a broader definition also includes the study of brain activity and structure.

> **KEY TERM**
> **Cognitive neuroscience**
> An approach that aims to understand human cognition by combining information from behaviour and the brain.

What do *you* think is the correct answer? Brañas-Garza et al. (2015) found in a review of findings from 41,004 individuals that 68% produced the wrong answer (typically 10 cents) and only 32% gave the right answer (5 cents). Even providing financial incentives to produce the correct answer failed to improve performance.

The above findings suggest most people will rapidly produce an incorrect answer (i.e., 10 cents) that is easily accessible and are unwilling to devote extra time to checking that they have the right answer. However, Gangemi et al. (2015) found many individuals producing the wrong answer had a feeling of error suggesting they experienced cognitive uneasiness about their answer. In sum, the intriguing findings on the Cognitive Reflection Test indicate that we can fail to think effectively even on relatively simple problems. Subsequent research has clarified the reasons for these deficiencies in our thinking (see Chapter 12).

The aims of cognitive neuroscientists overlap with those of cognitive psychologists. However, there is one major difference between cognitive neuroscience and cognitive psychology in the narrow sense. Cognitive neuroscientists argue convincingly we need to study the *brain* as well as behaviour while people engage in cognitive tasks. After all, the internal processes involved in human cognition occur in the brain. **Cognitive neuroscience** uses information about behaviour and the brain to understand human cognition. Thus, the distinction between cognitive neuroscience and cognitive psychology in the broader sense is blurred.

Cognitive neuroscientists explore human cognition in several ways. First, there are brain-imaging techniques of which functional magnetic resonance imaging (fMRI) is probably the best-known. Second, there are electrophysiological techniques involving the recording of electrical signals generated by the brain. Third, many cognitive neuroscientists study the effects of brain damage on cognition. It is assumed the patterns of cognitive impairment shown by brain-damaged patients can inform us about normal cognitive functioning and the brain areas responsible for various cognitive processes.

The huge increase in scientific interest in the workings of the brain is mirrored in the popular media – numerous books, films and television programmes communicate the more accessible and dramatic aspects of cognitive neuroscience. Increasingly, media coverage includes coloured pictures of the brain indicating the areas most activated when people perform various tasks.

Four main approaches

We can identify four main approaches to human cognition (see Table 1.1). Note, however, there has been a substantial increase in research combining two (or even more) of these approaches. We will shortly discuss each approach in turn and you will probably find it useful to refer back to this chapter when reading the rest of the book. Hopefully, you will find Table 1.3 (towards the end of this chapter) especially useful because it summarises the strengths and limitation of all four approaches.

TABLE 1.1 APPROACHES TO HUMAN COGNITION

1. *Cognitive psychology*: this approach involves using behavioural evidence to enhance our understanding of human cognition. Since behavioural data are also of great importance within cognitive neuroscience and cognitive neuropsychology, cognitive psychology's influence is enormous.
2. *Cognitive neuropsychology*: this approach involves studying brain-damaged patients to understand normal human cognition. It was originally closely linked to cognitive psychology but has recently also become linked to cognitive neuroscience.
3. *Cognitive neuroscience*: this approach involves using evidence from behaviour and the brain to understand human cognition.
4. *Computational cognitive science*: this approach involves developing computational models to further our understanding of human cognition; such models increasingly incorporate knowledge of behaviour and the brain. A computational model takes the form of an **algorithm**, which consists of a precise and detailed specification of the steps involved in performing a task. Computational models are designed to simulate or imitate human processing on a given task.

KEY TERM

Algorithm
A computational procedure providing a specified set of steps to problem solution; see **heuristic**.

COGNITIVE PSYCHOLOGY

We can obtain some perspective on the contribution of cognitive psychology by considering what preceded it. Behaviourism was the dominant approach to psychology throughout the first half of the twentieth century. The American psychologist John Watson (1878–1958) is often regarded as the founder of behaviourism. He argued that psychologists should focus on stimuli (aspects of the immediate situation) and responses (behaviour produced by the participants in an experiment). This approach appears "scientific" because it focuses on stimuli and responses, both of which are observable.

Behaviourists argued that internal mental processes (e.g., attention) cannot be verified by reference to observable behaviour and so should be ignored. According to Watson (1913, p. 165), behaviourism should "never use the terms consciousness, mental states, mind, content, introspectively verifiable and the like". In stark contrast, as we have already seen, cognitive psychologists argue it is of crucial importance to study such internal mental processes. Hopefully, you will be convinced that cognitive psychologists are correct when you read how the concepts of attention (Chapter 5) and consciousness (Chapter 16) have been used fruitfully to enhance our understanding of human cognition.

It is often claimed that behaviourism was overthrown by the "cognitive revolution". However, the reality was less dramatic (Hobbs & Burman, 2009). For example, Tolman (1948) was a behaviourist but he did not believe internal processes should be ignored. He carried out studies in which rats learned to run through a maze to a goal box containing food. When Tolman blocked off the path the rats had learned to use, they rapidly learned to follow other paths leading in the right general direction. Tolman concluded the rats had acquired an internal *cognitive map* indicating the maze's approximate layout.

It is almost as pointless to ask "When did cognitive psychology start?", as to enquire "How long is a piece of string?". However, 1956 was crucially

KEY TERMS

Bottom-up processing
Processing directly influenced by environmental stimuli; see **top-down processing**.

Serial processing
Processing in which one process is completed before the next one starts; see **parallel processing**.

Top-down processing
Stimulus processing that is influenced by factors such as the individual's past experience and expectations.

important. At a meeting at the Massachusetts Institute of Technology, Noam Chomsky presented his theory of language, George Miller discussed the magic number seven in short-term memory (Miller, 1956) and Alan Newell and Herbert Simon discussed the General Problem Solver (see Gobet and Lane, 2015). In addition, there was the first systematic attempt to study concept formation from the cognitive perspective (Bruner et al., 1956). The history of cognitive psychology from the perspective of its classic studies is discussed in Eysenck and Groome (2015a).

Several decades ago, most cognitive psychologists subscribed to the information-processing approach based loosely on an analogy between the mind and the computer (see Figure 1.1). A stimulus (e.g., a problem or task) is presented, which causes various internal processes to occur, leading eventually to the desired response or answer. Processing directly affected by the stimulus input is often described as **bottom-up processing**. It was typically assumed only one process occurs at a time: this is **serial processing**, meaning the current process is completed before the onset of the next one.

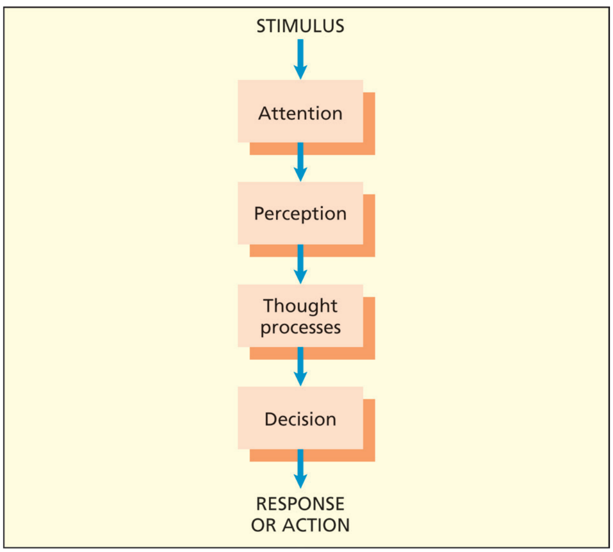


Figure 1.1
An early version of the information processing approach.

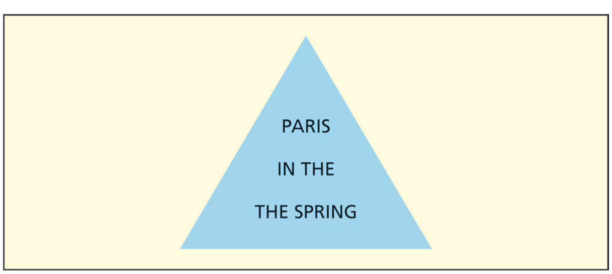


Figure 1.2
Diagram to demonstrate top–down processing.

The above approach is drastically oversimplified. Task processing typically also involves **top-down processing**, which is processing influenced by the individual's expectations and knowledge rather than simply by the stimulus itself. Read what it says in the triangle (Figure 1.2). Unless you know the trick, you probably read it as "Paris in the spring". If so, look again: the word "the" is repeated. Your expectation it was a well-known phrase (i.e., top-down processing) dominated the information available from the stimulus (i.e., bottom-up processing).

The traditional approach was also oversimplified in assuming processing is typically serial. In fact, more than one process typically occurs at the same time – this is **parallel processing**. We are much more likely to use parallel processing when performing a highly practised task than a new one (see Chapter 5). For example, someone taking their first driving lesson finds it very hard to control the car's speed, steer accurately and pay attention to other road users at the same time. In contrast, an experienced driver finds it easy.

There is also **cascade processing**: a form of parallel processing involving an *overlap* of different processing stages when someone performs a task. More specifically, later stages of processing are initiated before one or more earlier stages have finished. For example, suppose you are trying to work out the meaning of a visually presented word.

The most thorough approach would involve identifying all the letters in the word followed by matching the resultant letter string against words you have stored in long-term memory. In fact, people often engage in cascade processing – they form hypotheses as to the word that has been presented *before* identifying all the letters (McClelland, 1979).

An important issue for cognitive psychologists is the task-impurity problem – most cognitive tasks require several processes thus making it hard to interpret the findings. One approach to this problem is to consider various tasks all requiring the same process. For example, Miyake et al. (2000) used three tasks requiring deliberate inhibition of a dominant response:

(1) The Stroop task: name the colour in which colour words are presented (e.g., RED printed in green) and avoid saying the colour word (which has to be inhibited). You can see for yourself how hard this task is by naming the colours of the words shown in Figure 1.3.
(2) The anti-cascade task: inhibit the natural tendency to look at a visual cue and instead look in the opposite direction. People typically take longer to perform this task than the control task of simply looking at the visual cue.
(3) The stop-signal task: respond rapidly to indicate whether each of a series of words is an animal or non-animal; on key trials, there was a computer-emitted tone indicating that the response should be inhibited.

Miyake et al. (2000) found all three tasks involved similar processes. They used complex statistical techniques (latent variable analysis) to extract what

KEY TERMS

Parallel processing
Processing in which two or more cognitive processes occur at the same time.

Cascade processing
Later processing stages start before earlier processing stages have been completed when performing a task.

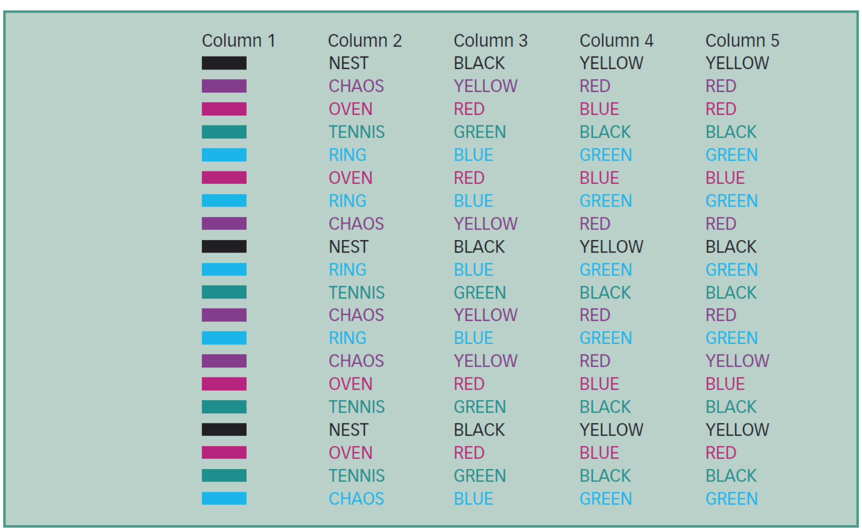


Figure 1.3
Test yourself by naming the colours in each column. You should name the colours rapidly in the first three columns because there is no colour-word conflict. In contrast, colour naming should be slower (and more prone to error) when naming colours in the fourth and fifth columns.

KEY TERMS

Ecological validity
The applicability (or otherwise) of the findings of laboratory studies to everyday settings.

Implacable experimenter
The situation in experimental research in which the experimenter's behaviour is uninfluenced by the participant's behaviour.

was common across the three tasks. This was assumed to represent a relatively pure measure of the inhibitory process. Throughout this book, we will discuss many ingenious strategies used by cognitive psychologists to identify the processes used in numerous tasks.

Strengths

Cognitive psychology was for many years the engine room of progress in understanding human cognition and the other three approaches listed in Table 1.1 have benefitted from it. For example, cognitive neuropsychology became important 25 years after cognitive psychology. It was only when cognitive psychologists had developed reasonable accounts of healthy human cognition that the performance of brain-damaged patients could be understood fully. Before that, it was hard to decide which patterns of cognitive impairment were theoretically important.

In a similar fashion, the computational modelling activities of computational cognitive scientists are typically heavily influenced by pre-computational psychological theories. Finally, the great majority of theories driving research in cognitive neuroscience originated within cognitive psychology.

Cognitive psychology has not only had a massive influence on theorising across all four major approaches to human cognition. It has also had a predominant influence on the development of cognitive tasks and on task analysis (how a task is accomplished).

Limitations

In spite of cognitive psychology's enormous contributions, it has several limitations. First, our behaviour in the laboratory may differ from our behaviour in everyday life. Thus, laboratory research sometimes lacks **ecological validity** – the extent to which laboratory findings are applicable to everyday life. For example, our everyday behaviour is often designed to change a situation or to influence others' behaviour. In contrast, the sequence of events in most laboratory research is based on the experimenter's predetermined plan and is uninfluenced by participants' behaviour. Wachtel (1973) used the term **implacable experimenter** to describe this state of affairs.

We must not exaggerate problems associated with lack of ecological validity. As we will see in this book, there has been a dramatic increase in applied cognitive psychology in which the emphasis is on investigating topics of general importance. Such research often has good ecological validity. Note that it is far better to carry out well-controlled experiments under laboratory conditions than poorly controlled experiments under naturalistic conditions. It is precisely because it is considerably easier for researchers to exercise experimental control in the laboratory that so much research is laboratory-based.

Second, theories in cognitive psychology are often expressed only in verbal terms (although this is becoming less common). Such theories are vague, making it hard to know precisely what predictions follow from them and thus to falsify them. These limitations can largely be overcome by computational cognitive scientists developing cognitive models specifying precisely any given theory's assumptions.

Third, difficulties in falsifying theories have led to a proliferation of different theories on any given topic. For example, there are at least 12 different theories of working memory (see Chapter 6). Another reason for the proliferation of rather similar theories is the "toothbrush problem" (Mischel, 2008): no self-respecting cognitive psychologist wants to use anyone else's theory.

Fourth, the findings obtained using any given task or paradigm are sometimes *specific* to that paradigm and do not generalise to other (apparently similar) tasks. This is **paradigm specificity**. It means some findings are narrow in scope and applicability (Meiser, 2011). This problem can be minimised by developing theories accounting for performance across several tasks or paradigms. For example, Anderson et al. (2004; discussed later in this chapter) developed a comprehensive theoretical architecture or framework known as the Adaptive Control of Thought-Rational (ACT-R) model.

Fifth, cognitive psychologists typically obtain measures of performance speed and accuracy. These measures are very useful but provide only *indirect* evidence about internal cognitive processes. Most tasks are "impure" in that they involve several processes, and it is hard to identify the number and nature of processes involved on the basis of speed and accuracy measures.

KEY TERMS

Paradigm specificity
The findings with a given experimental task or paradigm are not replicated even when apparently very similar tasks or paradigms are used.

lesion
Damage within the brain resulting from injury or disease; it typically affects a restricted area.

COGNITIVE NEUROPSYCHOLOGY

Cognitive neuropsychology focuses on the patterns of cognitive performance (intact and impaired) of brain-damaged patients having a **lesion** (structural damage to the brain caused by injury or disease). According to cognitive neuropsychologists, studying brain-damaged patients can tell us much about cognition in healthy individuals.

The above idea does not sound very promising, does it? In fact, however, cognitive neuropsychology has contributed substantially to our understanding of healthy human cognition. For example, in the 1960s, most memory researchers thought the storage of information in long-term memory depended on previous processing in short-term memory (see Chapter 6). However, Shallice and Warrington (1970) reported the case of a brain-damaged man, KF. His short-term memory was severely impaired but his long-term memory was intact. These findings played an important role in changing theories of healthy human memory.

Since cognitive neuropsychologists study brain-damaged patients, we might imagine they would be interested in the workings of the brain. In fact, many cognitive neuropsychologists pay little attention to the brain itself. According to Coltheart (2015, p. 198), for example, "Even though cognitive neuropsychologists typically study people with brain damage, . . . cognitive neuropsychology is not about the brain: it is about information-processing models of cognition."

An increasing number of cognitive neuropsychologists disagree with Coltheart. They believe we should consider the brain, using techniques such as magnetic resonance imaging to identify the brain areas damaged in any given patient. They are also increasingly willing to study the impact of brain damage on brain processes using various neuroimaging techniques.

Max Coltheart.
Courtesy of Max Coltheart.

Theoretical assumptions

Coltheart (2001) provided a very clear account of the major assumptions of cognitive neuropsychology. Here we will discuss these assumptions and briefly consider relevant evidence.

One key assumption is **modularity**, meaning the cognitive system consists of numerous modules or processors operating fairly independently or separately of each other. It is assumed these modules exhibit domain specificity (they respond to only one given class of stimuli). For example, there may be a face-recognition module that responds only when a face is presented.

Modular systems typically involve serial processing with processing within one module being completed before processing starts in the next module. As a result, there is very limited *interaction* among modules. There is some support for modularity from the evolutionary approach. Species with larger brains generally have more specialised brain regions that could be involved in modular processing. However, the notion that human cognition is heavily modular is hard to reconcile with neuroimaging evidence. The human brain possesses a moderately high level of connectivity (Bullmore & Sporns, 2012; see p. 14), suggesting there is more parallel processing than assumed by most cognitive neuropsychologists.

The second major assumption is that of *anatomical modularity*. According to this assumption, each module is located in a specific brain area. Why is this assumption important? Cognitive neuropsychologists are most likely to make progress when studying brain patients with brain damage limited to a *single* module. Such patients may not exist if there is no anatomical modularity. Suppose all modules were distributed across large brain areas. If so, the great majority of brain-damaged patients would suffer damage to most modules, making it impossible to work out the number and nature of their modules.

There is evidence of anatomical modularity in the visual processing system (see Chapter 2). However, there is less support for anatomical modularity with most complex tasks. For example, consider the findings of Yarkoni et al. (2011). Across over 3,000 neuroimaging studies, some brain areas (e.g., dorsolateral prefrontal cortex; anterior cingulate cortex) were activated in 20% of them despite the great diversity of tasks involved.

The third major assumption (the "universality assumption") is that "Individuals . . . share a similar or an equivalent organisation of their cognitive functions, and presumably have the same underlying brain anatomy"

KEY TERM

Modularity
The assumption that the cognitive system consists of many fairly independent or separate modules or processors, each specialised for a given type of processing.

(de Schotten and Shallice, 2017, p. 172). If this assumption (also common within cognitive neuroscience) is false, we could not readily use the findings from individual patients to draw conclusions about the organisation of other people's cognitive systems or functional architecture.

There is accumulating evidence against the universality assumption. Tzourio-Mazoyer et al. (2004) discovered substantial differences between individuals in the location of brain networks involved in speech and language. Finn et al. (2015) found clear-cut differences between individuals in functional connectivity across the brain, concluding that "An individual's functional brain connectivity profile is both unique and reliable, similarly to a fingerprint" (p. 1669).

Duffau (2017) reviewed interesting research conducted on patients during surgery for epilepsy or a tumour. Direct electrical stimulation, which causes "a genuine virtual transient lesion" (p. 305) is applied invasively to the cortex. The patient is awakened and given various cognitive tasks while receiving stimulation. Impaired performance when direct electrical stimulation is applied to a given area indicates that area is involved in the cognitive functions assessed by the current task.

Findings obtained using direct electrical stimulation and other techniques (e.g., fMRI) led Duffau (2017) to propose a two-level model. At the *cortical* level, there is high variability across individuals in structure and function of any given brain areas. At the *subcortical* level (e.g., in premotor cortex), in contrast, there is very little variability across individuals. The findings at the cortical level seem inconsistent with the universality assumption.

The fourth assumption is *subtractivity*. The basic idea is that brain damage impairs one or more processing modules but does not change or add anything. The fifth assumption (related to subtractivity) is *transparency* (Shallice, 2015). According to the transparency assumption, the performance of a brain-damaged patient reflects the operation of a theory designed to explain the performance of healthy individuals minus the impact of their lesion.

Why are the subtractivity and transparency assumptions important? Suppose they are incorrect and brain-damaged patients develop new modules to compensate for their cognitive impairments. That would greatly complicate the task of learning about the intact cognitive system by studying brain-damaged patients. Consider **pure alexia**, a condition in which brain-damaged patients have severe reading problems but otherwise intact language abilities. These patients generally have a direct relationship between word length and reading speed due to letter-by-letter processing (Bormann et al., 2015). This indicates the use of a compensatory strategy differing markedly from the reading processes used by healthy adults.

KEY TERM

Pure alexia
Severe problems with reading but not other language skills; caused by damage to brain areas involved in visual processing.

Research in cognitive neuropsychology

How do cognitive neuropsychologists set about understanding the cognitive system? Of major importance is the search for dissociations, which occur when a patient has normal performance on one task (task X) but is impaired on a second one (task Y). For example, amnesic patients perform almost normally on short-term memory tasks but are greatly impaired on many