



SIXTH EDITION

# PSYCHOLOGY

G. NEIL MARTIN

NEIL R. CARLSON



Pearson



Pearson

At Pearson, we have a simple mission: to help people make more of their lives through learning.

We combine innovative learning technology with trusted content and educational expertise to provide engaging and effective learning experiences that serve people wherever and whenever they are learning.

From classroom to boardroom, our curriculum materials, digital learning tools and testing programmes help to educate millions of people worldwide – more than any other private enterprise.

Every day our work helps learning flourish, and wherever learning flourishes, so do people.

To learn more, please visit us at [www.pearson.com/uk](http://www.pearson.com/uk)

## Cutting edge: *Continued*

quality of argument, presence of a thesis, counterargument and general text quality.

Even when taking into account socio-economic variables or university admissions test scores, writing skill predicted first-year university grades: the better the writing skill, the better the grade. But what was also illuminating was the finding that this relationship extended across eight semesters of learning. The researchers looked at the achievement records

of 1,616 students and found that writing skill predicted academic success across the degree. Writing skill was found to be a better predictor of academic achievement across the programme than was mathematical skill. This study was based on one cohort admitted to one university in one country. Would you expect these results to generalise to other students? And why do you think writing skills were such a strong predictor of academic success?

## Studying psychology – An international perspective

You might think that most psychology students study similar topics over similar periods of time across the world. In a sense, this is right but some countries teach psychology in different ways; some have only recently developed psychology degrees; some teach psychology to achieve a particular end such as training in educational psychology. How does the teaching of psychology differ across the world?

In Australia, psychology departments exist in almost all universities (in 2006 only three did not have one) (Wilson and Provost, 2006). Like those in the UK, departments in the older universities evolved from philosophy departments in the early twentieth century. Again, like the UK, the 1980s saw an expansion of Australian institutes calling themselves universities and thus offering university psychology degrees (the parallel in the UK is the transmogrification of the polytechnics into universities in the early 1990s). Like the UK, courses are accredited by a professional organisation (the Australian Psychological Society). Psychology students in Australia can study three types of psychology degrees: a three-year degree that does not prepare the student to practise psychology; a four-year degree, which does and involves the writing of a thesis and the study of ethics; and graduate degrees.

Courses are slightly different in Italy. Here, in 2006, students could study for a three-year degree, which qualifies them to practise as a 'psychological assistant' in a restricted range of areas (Prandini and McCarthy, 2006), or a five-year degree which involves an additional two years of study which qualifies the student to practise. The student then pursues a graduate programme in a specific area to specialise further. All public school teachers in Italy have to complete a postgraduate course which involves training in psychology (Prandini and McCarthy, 2006).

Surprisingly for a country that is the birthplace of modern psychology, Germany only established its first professional curriculum in psychology in 1941 (Hodapp and Langfeldt, 2006). In the 1960s, there were 18 universities offering psychology to 2,000 students taught by 31 professors. In the 1980s, there were 30 universities teaching 18,000 students. By 2006, there were around 43 universities with 450 professors teaching 32,000 students (Hodapp and Langfeldt, 2006).

Approximately 70 per cent of students are women, a figure that is echoed in the UK. German universities are changing and as of 2004, a Diplom qualification now entitles students to work in a profession related to psychology. As with all the degrees mentioned so far, the emphasis in German education is on teaching skills that will enable students to apply scientific principles to human behaviour.

The large number of departments in Germany, and other countries, isn't seen elsewhere. Greece, for example, in 2006 had four psychology departments offering two types of 'undergraduate' degree: a Ptychion (Bachelor's) degree, lasting four years, and a Master's degree (Metaptychiako Diploma) in an area such as clinical, school/educational or organisational psychology – this can last up to three years and involves internship at a relevant institution (Georgas, 2006).

The compactness of provision in Greece contrasts with Russia: 100 psychology departments have been established in the past decade (Karandashev, 2006). In 2006, students at Russian universities could study for four (Bachelor's degree) or five years (Specialist degree), in programmes regulated by the Ministry of Education (Karandashev, 2006). The four-year course trains students in general psychology; the five-year course prepares them for professional work. While Russia has divested itself of its communist shackles (partly), China has not. Psychology became an independent university discipline in China in 1960 but, following the 'Cultural Revolution' of 1966–76 and the resultant closure of all universities, psychology was attacked as pseudoscience (Zhang and Xu, 2006). Since 1980, however, psychology has clawed its way back into the university curriculum and is now one of the most popular science subjects (Zhang and Xu, 2006).

Finally, and interestingly given the politically fractious times in which we live, what of Iran? Iran was no academic late-developer: it was running courses in psychology in the 1920s. In 2006, 19 universities offered psychology courses, with the BS (Bachelor of Science) degree being awarded after four years of study (Alipour, 2006). In 2003, the Islamic Iranian parliament passed a law that granted equal status to medical and psychological counselling services.

## Psychology in action: What will make you a better student?

You know the drill by now. You've lectures to attend, essays to write, lab reports to complete, papers to find, chapters in very large books to read. . . it can seem overwhelming. And when it comes to exam time with all the revision preparation that's expected and necessary, it can feel very overwhelming. Are there any steps you can take to improve your learning, any skills or techniques you could learn to make the process of learning easier and more effective?

Actually, yes, there are. And research from psychology – particularly, cognitive psychology – has helped determine which they are (Roediger and Pyc, 2012; Dunlosky *et al.*, 2013; Dunn *et al.*, 2013).

A number of techniques has been cited as helpful to learning: highlighting in textbooks, re-reading passages from a book or paper, testing yourself, writing, mnemonics, being asked inquisitive questions, and cramming. However, only some of these work: that is, only some show demonstrable effects on learning. And you might be surprised – and, in one case, disappointed – by what they are.

One technique that has moderate success is 'elaborative questioning/interrogation' and 'self-explanation'. That is, being prompted (or being prompted by yourself) to think about why something has happened or been found can help learning. For example, in one study undergraduates were presented with a list of sentences describing the actions of a man (e.g. 'The hungry man got into the car') (Pressley *et al.*, 1987). One group was encouraged to ask questions about why the man behaved in this way. A second group were provided with an explanation. And third just read the sentences. They were then asked questions about the statements they had been presented with. The results were astonishing. The 'why' group was accurate 72 per cent of the time, compared with 37 per cent for the other two groups. This finding is not uncommon and extends beyond simple sentences. The same approach has been found to be successful in students who read a new chapter for a biology class and were prompted to answer questions (Smith *et al.*, 2010).

Does underlining or highlighting work? The evidence suggests that it doesn't although the research is hampered by poor studies. Students vary in the amount of text they highlight. If the text is highlighted for students by someone else, however, they do remember those sections and adjacent sections better (Cashen and Leicht, 1970; Lorch, 1989). Highlighting is a shallow, almost automatic activity. Its success probably depends on what you highlight and what you later do with the highlighted section. For example, if you went through a text

highlighting, then took notes from the highlighted sections and only summarised the sections you needed, would it help you? (I'll let you into a little secret, this is how I – GNM – take notes in preparation for writing the editions of this book and lengthy introductions to journal papers.)

Re-reading seems to have little effect on learning, neither does the use of mnemonics (in the context of undergraduate learning).

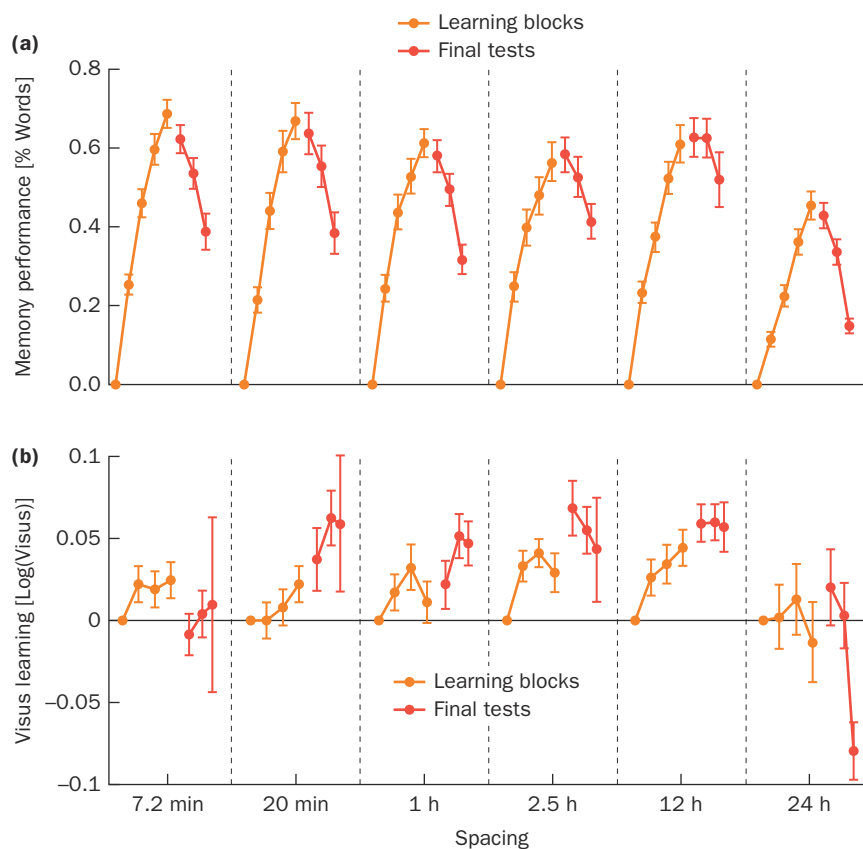
Interleaving your work – alternating different types of work – can be beneficial, especially for mathematics performance (Dunlosky *et al.*, 2013) but also for other types of cognitive performance. A related technique is spacing. You'll discover more about this in the next chapter, but spacing your practice is associated with better performance on a range of abilities and skills than is massed practice (cramming). It is a very old technique – Ebbinghaus used it to remember nonsense syllables (more in the next chapter) – but is reliable (Cepeda *et al.*, 2006; Wahlheim *et al.*, 2011). In a typical spacing exercise, you might have to learn something for five minutes every five minutes and an irrelevant activity would be introduced every five minutes, thus breaking up or chunking learning. Studies which have compared interleaving with spaced learning produce comparable results (Roher and Pashler, 2010). Some effects of spacing and interleaving on learning can be seen in Figure 7.9. Learning German–Japanese word pairs was found to be more effective, as was visual acuity, after a space of 12 hours than 24 hours (Kornmeier *et al.*, 2014).

The best example of blocked practice/learning of course is cramming (especially for exams). There is no evidence that this works in the long-term or the short-term. As William James (1890) remarked: 'The reason why cramming is such a bad mode of study is now made clear. . . . Things learned in a few hours, on one occasion, for one purpose, cannot possibly form many associations with other things. . . . Speedy oblivion is the almost inevitable fate of all that is committed to memory in this single way' (p. 445). Think of speedy oblivion the next time you're tempted to do a bit of cramming before an exam.

And so we come to the technique that is probably the most effective way of learning, but is one that you will probably like the least. We know you will like it the least because studies of students tell us so. The method is: testing, especially frequent testing. No other technique described here is as effective nor as reliable in facilitating learning. The short conclusion is: students remember more when they're regularly



## Psychology in action: *Continued*



**Figure 7.9** Some effects of spacing on cognitive performance and learning.

tested on material (Carpenter, 2012; Roediger and Pyc, 2012). In a typical experiment, one group is asked to learn material and is tested while a second group learns material and then re-studies it. On a subsequent test, performance of the first group is significantly better than the second's (Roediger and Karpicke, 2006; Karpicke and Grimaldi, 2012). If students are asked to read textbook chapters for an introductory psychology class or are asked to read the chapters and then this reading is tested in daily quizzes, the latter group achieve better scores when later tested about the textbook material (Batsell *et al.*, 2017).

Here's another example (Roediger and Karpicke, 2006). In one study, students are given passages to read and are told they would be tested later. One group reads the passage on four different occasions. One group reads the passage on

three occasions and is then tested. One group reads the passage once and is tested three times. They then free recall (unprompted) as much of the passage as they can. Who do you think would perform better? Students in the experiment who were asked this – the same ones who took part in the actual experiment – said they thought the first group would perform best. The group that performed best was the third. There was also an interesting effect of time. If recall was measured immediately, the result was consistent with the students' prediction. However, after a week, this reversed: group one performed the worst; group three performed the best. Speedy oblivion. A good way to help you learn using this technique would be for a tutor to set you a series of quizzes, about 5–10 minutes long, regularly. You can also self-test. Use flashcards – this works, too (Wissman *et al.*, 2012).

## Chapter review

### Habituation and classical conditioning

- Habituation screens out stimuli that experience has shown to be unimportant. This form of learning allows organisms to respond to more important stimuli, such as those related to survival and reproduction.
- Classical conditioning occurs when a neutral stimulus occurs just before an unconditional stimulus (UCS) – one that automatically elicits a behaviour. The response that an organism makes in response to the unconditional stimulus (the UCR) is already a natural part of its behaviour; what the organism learns to do is to make it in response to a new stimulus (the conditional stimulus, or CS). When the response is made to the CS, it is called the conditional response, or CR.
- The relationship between the conditional stimulus and unconditional stimulus determines the nature of the conditional response. Acquisition of the conditional response is influenced by the intensity of the unconditional stimulus and the delay between the conditional stimulus and unconditional stimulus.
- Extinction occurs when the conditional stimulus is still presented but is no longer followed by the unconditional stimulus; the conditional response may show spontaneous recovery later, even after a delay.
- Generalisation occurs when stimuli similar to the conditional stimulus used in training elicit the conditional response.
- Discrimination involves training the organism to make a conditional response only after a particular conditional stimulus occurs.
- Classical conditioning can also establish various classes of stimuli as objects of fear (phobia) or of sexual attraction (fetishes). For classical conditioning to occur, the conditional stimulus must not only occur immediately before the unconditional stimulus, but it must also reliably predict the occurrence of the unconditional stimulus.

### After behaviourism

- Hull's theory of learning reduced behaviour to numerical values; using these values Hull's system sought to predict behaviour.
- Tolman's theory of learning argued that stimulus–response models were too simplistic and suggested the concept of intervening variables – variables which mediated the relationship between a stimulus and the response to it. Tolman's research led to the coining of the term cognitive

map to describe our ability to manipulate three-dimensional environments in the mind.

### Operant conditioning

- The law of effect specifies a relation between behaviour and its consequences. If a stimulus that follows a response makes that response become more likely, we say that the response was reinforced. If the stimulus makes the response become less likely, we say that it was punished. The reinforcing or punishing stimulus must follow the behaviour almost immediately if it is to be effective.
- The process of operant conditioning helps adapt an organism's behaviour to its environment.
- Skinner described the relation between behaviour and environmental events as a three-term contingency: in the presence of discriminative stimuli, a consequence will occur if and only if an operant response occurs.
- A reinforcer is an appetitive stimulus that follows an operant response and causes that response to occur more frequently in the future.
- A punisher is an aversive stimulus that follows an operant response and causes it to occur less frequently in the future.
- If an aversive stimulus is terminated after a response occurs, the response is reinforced through a process called negative reinforcement. The termination of an appetitive stimulus can punish a response through a process called response cost.
- Extinction occurs when operant responses are emitted but not reinforced, which makes sense because organisms must be able to adapt their behaviour to changing environments.
- Complex responses, which are unlikely to occur spontaneously, can be shaped by the method of successive approximations.
- Various types of schedule of reinforcement have different effects on the rate and pattern of responding. When a response is reinforced intermittently, it is more resistant to extinction, probably because an intermittent reinforcement schedule resembles extinction more than a continuous reinforcement schedule does.
- Discrimination involves the detection of essential differences between stimuli or situations so that responding occurs only when appropriate.
- Generalisation is another necessary component of all forms of learning because no two stimuli, and no two responses, are precisely the same. Thus, generalisation embodies the ability to apply what is learned from one experience to similar experiences.

- The major difference between classical conditioning and operant conditioning is in the nature of the contingencies: classical conditioning involves a contingency between stimuli (CS and UCS), whereas operant conditioning involves a contingency between the organism's behaviour and an appetitive or aversive stimulus. The two types of conditioning complement each other. The pairings of neutral stimuli with appetitive and aversive stimuli (classical conditioning) determine which stimuli become conditioned reinforcers and punishers.

### Conditioning of complex behaviours

- Much behaviour is under the control of aversive contingencies, which specify particular behaviours that are instrumental in either escaping or avoiding aversive stimuli.
- In conditioned flavour aversions, there is a delay between tasting a poison and getting sick; the rule that a reinforcing or punishing stimulus must immediately follow the response cannot, therefore, apply.
- We are able to acquire both operantly and classically conditioned responses through observation and imitation; we can learn to modify and combine responses learned in other contexts to solve new problems. This is referred to as insight.

- Behaviour analysts argue that behaviour is governed by external causes, such as discriminative stimuli and environmentally based reinforcers and punishers; cognitive psychologists maintain that behaviour is controlled by internal causes, such as thoughts, images, feelings and perceptions.

### Factors influencing learning in an academic context

- Research has shown that various factors can influence academic learning, including personality, group study, the type of learning materials and the style of teaching.
- Students normally begin courses by adopting superficial learning styles geared towards achieving grades and covering the basics; as they progress, learning becomes deeper and more thoughtful.
- While beginning students evaluate courses based on superficial factors, such as the lecturer's sense of humour, more advanced students value the lecturer's knowledge and the quality of the learning materials more.
- The key to understanding material in textbooks is to underline the parts that you consider relevant first and then to write these parts in your own words.

## Suggestions for further reading

### Learning – general reading

- Healy, A.F., Jones, M., Lalchandani, L. and Tack, L.A. (2017) Timing of quizzes during learning: effects on motivation and retention. *Journal of Experimental Psychology. Applied*, in press.
- Malott, R.W. and Shane, T.W. (2013) *Principles of Behaviour* (7th edn). Boston, MA: Prentice Hall.
- Martin, G.L. and Pear, J. (2014) *Behaviour Modification: What is it and how to do it* (10th edn). Boston, MA: Prentice Hall.
- Mazur, J.E. (2017) *Learning and Behaviour*. London: Routledge.
- Miltenberger, R. (2015). *Behaviour Modification* (6th edn). London: Wadsworth.
- Olson, M. (2012) *Introduction to the Theories of Learning* (9th edn). Boston, MA: Prentice Hall.
- Terry, S. (2017) *Learning and Memory* (5th edn). Boston, MA: Allyn & Bacon.
- Good, comprehensive accounts of the psychology of learning.

### Learning – specific reading

- Beck, H.P., Levinson, S. and Irons, G. (2009) Finding Little Albert. *American Psychologist*, 64, 605–14.
- Harris, B. (1979) Whatever happened to Little Albert? *American Psychologist*, 34, 2, 151–60.
- McSweeney, F.K. and Murphy, E.S. (2014). *Wiley-Blackwell Handbook of Operant and Classical Conditioning*. London: John Wiley.
- Pashler, H., McDaniel, M., Rohrer, D. and Bjork, R (2009). Learning styles. *Psychological Science in the Public Interest*, 9, 105–19.
- Watson, J.B. and Rayner, R. (1920) Conditioned emotional reactions. *Journal of Experimental Psychology*, 3, 1–14.
- Watson and Rayner's original article on conditioned human fear is a classic of its kind – the first scientific study of conditioning of fear in a human being. Apart from its historical interest, it is also useful to read in order to avoid the mistakes highlighted in Harris's incisive review.