

# Psychology 2019 v1.3

## Unit 3 annotated bibliography

### Unit 3: Individual thinking

#### Unit description

In Unit 3, students explore the ways psychology is used to describe and explain the role of the human nervous system in individual thinking, and the cognitive processes involved in perception, memory, and learning. They will develop an understanding of the structure and function of the human nervous system, including the role of specialised areas of the brain. Understanding the relationships between localised function and specific behaviours is essential to appreciating the impact of interference in the cognitive processes. Students investigate biological, psychological and social influences on visual perception. They also examine models of memory and explore the brain structures responsible for specific aspects of remembering. Students explore three theories of learning, including how fear can be a learnt response.

Contexts that could be investigated in this unit include how damage to areas of the brain can lead to changes in behaviour, the influence of experience and expectations on visual perception, how models of memory can be contested and refined based on new information, and how the media can influence learning.

Annotation	Evaluation	Similar/related research
<b>Topic 1: Localisation of function in the brain</b>		
<b>Bibliographic citation:</b> The Lancet 2014, 'Levodopa better than newer drugs for long-term treatment of Parkinson's, largest-ever trial shows', <i>ScienceDaily</i> , 10 June, <a href="http://www.sciencedaily.com/releases/2014/06/140610205305.htm">www.sciencedaily.com/releases/2014/06/140610205305.htm</a> .		
<ul style="list-style-type: none"> <li>• <i>The Lancet</i> journal is a major contributor to health and medical media coverage worldwide. The journal considers any original contribution that advances or illuminates medical science or practice, or that educates or entertains the journal's readers.</li> <li>• This article was written by a Parkinson's disease (PD) MED Collaborative Group consisting of contributors from well-known universities throughout the UK. The lead researcher on the study was Professor Richard Gray from the University of Oxford.</li> <li>• The article describes PD as the second most common neurodegenerative disorder after Alzheimer's disease (AD) in the UK. Treatment options for patients diagnosed with PD historically included the drug levodopa. However, with prolonged use patients often reported undesirable side effects, including muscle spasms and other motor fluctuations. In recent times, dopamine agonists (DAs) and monoamine oxidase type B inhibitors (MAO-B inhibitors) have been developed. Possible side effects of these newer medications include hallucinations, nausea and sleep disturbance.</li> <li>• The researchers conducted a trial with the aim of determining the long-term symptoms of patients prescribed these medications. They recruited 1620 people with early PD who were prescribed either levodopa or levodopa-sparing therapy (DA or MAO-B inhibitors). The participants answered self-report scores on scales measuring mobility and quality of life over a seven-year period.</li> <li>• The results found that the patients who were prescribed levodopa reported persistent health benefits and significantly higher scores on scales measuring activities of daily living, stigma, cognition, communication and bodily discomfort. However, they also reported more involuntary muscle spasms than patients taking levodopa-sparing therapies.</li> <li>• The researchers concluded that, although the differences in favour of levodopa were small, when the short- and long-term benefits, side effects, quality of life for patients and costs were considered, levodopa was still the best initial treatment strategy for most patients diagnosed with PD.</li> </ul>	<ul style="list-style-type: none"> <li>• This article is accessible to a student audience.</li> <li>• This trial is the largest ever trial performed on PD and is likely to change clinical practice worldwide.</li> <li>• The article does not provide specific details about the study's research design. However, it does link to the original published article, which students can use to evaluate the validity and reliability of the findings.</li> <li>• The researchers used a large sample size (n = 1620), with two different treatment groups as a comparison, increasing validity.</li> <li>• The use of self-report scores is a strength in this instance, as patients could report their own mobility and quality of life. However, as the method used scales, it is possible that a range of patient experiences were either not reported or underreported if they were not evident on the scales. This may affect reliability and validity.</li> <li>• The article describes some of the symptoms and treatment side effects that people with PD may experience. Students could investigate the brain chemicals that levodopa, DA and MAO-B inhibitors affect, and deduce how these effects may lead to the reduction of symptoms in PD.</li> <li>• The article could be used to discuss the impact of interference in neurotransmitter function, with reference to PD and AD (symptoms and treatments).</li> </ul>	<ul style="list-style-type: none"> <li>• PD MED Collaborative Group 2014, 'Long-term effectiveness of dopamine agonists and monoamine oxidase B inhibitors compared with levodopa as initial treatment for Parkinson's disease (PD MED): A large, open-label, pragmatic randomised trial', <i>The Lancet</i>, vol. 384, no. 9949, pp. 1196–1205, doi:10.1016/S0140-6736(14)60683-8.</li> </ul>
<b>Bibliographic citation:</b> Massachusetts General Hospital 2016, 'Human amyloid-beta acts as natural antibiotic in the brain: Alzheimer's-associated amyloid plaques may trap microbes', <i>ScienceDaily</i> , 25 May, <a href="http://www.sciencedaily.com/releases/2016/05/160525161351.htm">www.sciencedaily.com/releases/2016/05/160525161351.htm</a> .		
<ul style="list-style-type: none"> <li>• <i>ScienceDaily</i> is a popular science news website. The site offers readers breaking news about the latest scientific discoveries in a user-friendly format.</li> <li>• This article was published in 2016 by the Massachusetts General Hospital. One of the contributors to the research is Robert Muir of the Genetics and Aging Research Unit in the Massachusetts General Institute for Neurodegenerative Disease (MGH-MIND).</li> <li>• This article summarises a study in which the researchers sought to find out more about the biological causes of Alzheimer's disease (AD), particularly the role of human amyloid-beta protein (A-beta). The researchers used mice genetically modified with human A-beta and a control group. They found that when given an infection, the mice with the genetic alteration tended to live significantly longer than the mice in the control group. They conducted a similar experiment using roundworms and found similar results.</li> </ul>	<ul style="list-style-type: none"> <li>• This article uses technical language that may be difficult for students to understand.</li> <li>• This study shows how genetically modified animals can be used to study human conditions in a controlled laboratory setting.</li> <li>• The findings of the study shed further light on the potential mechanism behind AD and offer possibilities for further research directions and treatments for the disease.</li> <li>• A strength of the study is the use of a control group. This allowed the researchers to draw cause-and-effect conclusions, increasing the reliability and validity of the research.</li> </ul>	—

Annotation	Evaluation	Similar/related research
<ul style="list-style-type: none"> <li>• Previous studies had used a synthetic version of A-beta. This study showed that human A-beta appears to be 1000 times more potent against infection than the synthetic type. Typically, human A-beta tends to bind together to form plaques that protect against inflammatory disease.</li> <li>• The researchers concluded that in AD, it could be possible that the brain perceives itself to be under attack from invading pathogens, and forms amyloid plaques as a protective measure. If so, the inflammatory pathways of the innate immune system could be a potential treatment target. However, they suggested that <ul style="list-style-type: none"> <li>- further research would be needed to confirm this</li> <li>- research could include looking at the brains of AD patients for microbes that may have triggered amyloid deposition as a protective response.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• A limitation of the study is the use of animals. It is difficult to extrapolate findings about a human degenerative disease such as AD from genetically modified mice and roundworms. This limits the validity of the findings.</li> <li>• The study could be used <ul style="list-style-type: none"> <li>- in teaching about AD. Reading the article could also be used as an extension activity to help students understand the underlying mechanisms behind the disease</li> <li>- to discuss the impact of interference in neurotransmitter function, with reference to PD and AD (symptoms and treatments).</li> </ul> </li> </ul>	
<b>Topic 2: Visual perception</b>		
<b>Bibliographic citation:</b> Hudson, W 1960, 'Pictorial depth perception in sub-cultural groups in Africa', <i>Journal of Social Psychology</i> , vol. 52, no. 2, pp. 183–208, doi:10.1080/00224545.1960.9922077.		
<ul style="list-style-type: none"> <li>• William Hudson was part of the National Institute for Personnel Research in Johannesburg, South Africa. His research interests were visual perception and culture.</li> <li>• In this investigation, Hudson investigated the individual differences in perception of two-dimensional (2D) and three-dimensional (3D) images (specifically depth perception) in Caucasian cultures vs. African cultures.</li> <li>• The social aspects of school were controlled by having samples with schooling and samples without schooling in the research. Overall, there were six groups with schooling, consisting of three Caucasian groups and three African groups, and five samples without schooling, consisting of one Caucasian and four African groups.</li> <li>• All groups were asked about their perception on a series of 2D and 3D images. The images were specially constructed with key visual perception cues, such as object sizing, depth cues and use of overlap and shadows to create 2D and 3D effects.</li> <li>• The results indicated that samples without schooling from both cultures were able to perceive 2D images but were not able to use visual cues to indicate 3D image perception. The sample with schooling showed cultural differences, with Caucasian samples showing a much higher rate of 3D perception of the images compared with the African groups with similar schooling experience.</li> <li>• Hudson concluded that there are cultural differences in the perception of images in the 2D or 3D spaces.</li> </ul>	<ul style="list-style-type: none"> <li>• A varied and socially controlled sample was used in this investigation. This suggests a high reliability of results; however, the study only investigated the depth cues and how these affected perceptions of dimensions.</li> <li>• Only two groups of cultures were investigated, so the generalisability of these results to cultures outside of these groups is questionable.</li> <li>• A strength of this research is that it was the first of its kind to indicate that history and cultural norms have a part to play in visual perception. It was also the springboard for research investigating cultural differences in visual perception.</li> <li>• A possible limitation of the research is that the reasons for the differing perceptions (i.e. whether participants saw two dimensions or three dimensions) were not investigated and may not have been solely cultural. Further research should aim to collect qualitative data to investigate this possibility.</li> <li>• The pictures used in the study are available in the methods section and provide a good introduction to the use of depth cues in visual perception.</li> <li>• The study could be used to evaluate the impact of social influences on visual perception.</li> </ul>	
<b>Bibliographic citation:</b> Deregowski, JB 1972, 'Pictorial perception and culture', <i>Scientific American</i> , vol. 227, no. 5, pp. 82–88, doi:10.1038/scientificamerican1172-82.		
<ul style="list-style-type: none"> <li>• Jan Deregowski is an Emeritus Professor at the University of Aberdeen, Scotland. He has spent his life investigating cultural differences in pictorial perception.</li> <li>• This study sought to investigate whether the perception of pictures relies on learning. The natural (quasi) experiment consisted of several different studies in which participants from Western cultures (unspecified) and various African countries (e.g. Zambia) viewed 3D pictures.</li> <li>• The first study used Hudson's test. The test consists of a series of pictures in which various combinations of three pictorial depth cues (relative size, superimposition and linear perspective) are presented. Participants in this study were shown the test and asked a number of questions including 'What is the man doing with the spear?' and 'What is nearer, the antelope or the elephant?' Both children and adults from African communities found it difficult to perceive depth in the pictorial material and were classified as either 2D or 3D perceivers.</li> <li>• In the second study, participants were shown a drawing of two squares, one behind the other and connected with a single rod. They were also given sticks and modelling clay and asked to build a model of what they saw. They found that almost all 3D perceivers built a 3D object. Participants who did not readily perceive depth in pictures (2D perceivers) tended to build a flat model.</li> <li>• In the third study, participants were asked to copy a 'two-pronged trident'. When asked to copy the ambiguous trident, participants who were classified as 3D perceivers spent more time looking at the ambiguous trident than at the control trident, whereas 2D perceivers did not differ significantly in the time spent viewing each of the two tridents.</li> <li>• The fourth study used an apparatus designed by Richard Gregory. This apparatus for studying perceived depth enables the participant to adjust a spot of light so that it appears to lie at the same depth as an object in a picture. It was found that 2D</li> </ul>	<ul style="list-style-type: none"> <li>• This experiment is an example of cross-cultural research. Undertaking this research often helps researchers to determine whether certain abilities are innate (natural) or learnt (environmental). A major concern with cross-cultural research is ensuring that the measures are equally fair for both cultures, so as not to introduce bias.</li> <li>• The pictures used by Deregowski have been criticised for not including texture gradient as a pictorial depth cue, which would seem an important cue for both Western and non-Western perceivers.</li> <li>• The conclusions put forward by Deregowski can be interpreted as being somewhat ethnocentric and there may be other alternative explanations for the findings. For example, the participants from the African countries may have had their own different ways of representing 3D pictures, resulting in a potential bias associated with not having accounted for this.</li> <li>• Regardless of criticisms, this work was praised for investigating cultural diversity in perception, which had been ignored by mainstream psychology.</li> </ul>	

Annotation	Evaluation	Similar/related research
<p>perceivers set the light at the same apparent depth regardless of where they were asked to place it in the picture. This was not the case for 3D perceivers, who used depth cues in the picture to determine depth.</p> <ul style="list-style-type: none"> <li>The final study used 'split-type drawings' (showing all the features of an object) to represent animals. It was found that 2D perceivers (mostly African children and adults) preferred these types of drawings to usual perspective drawings (showing objects from one perspective only).</li> <li>The main findings from this research are that many non-Western people lack pictorial depth perception and prefer split drawings to perspective drawings.</li> <li>To conclude, Deregowski stated that the findings are most likely due to non-Western tribal people having not learnt the ability to integrate depth cues in pictures due to having limited experience.</li> </ul>	<ul style="list-style-type: none"> <li>The paper has many good examples of the pictures used to test depth perception. These pictures can be found freely on the internet with keyword searches.</li> <li>The paper can be used to evaluate the impact of social influences on visual perception.</li> </ul>	
<p><b>Bibliographic citation:</b> Deregowski, JB, Muldrow ES &amp; Muldrow, WF 1972, 'Pictorial representation in a remote Ethiopian population', <i>Perception</i>, vol. 1, no. 4, pp. 417–425, doi:10.1068/p010417.</p>		
<ul style="list-style-type: none"> <li>Jan Deregowski and colleagues Elizabeth and William Muldrow, who were based in Ethiopia when this article was published, sought to investigate recognition of pictures by remote populations.</li> <li>Previous research had shown that remote populations had trouble in recognising familiar objects such as animals or people, in pictorial material. This was especially true for older adults and those who had not had exposure to such material before.</li> <li>In this study, all participants were from the Me'en (Mekan) community living in the Kaffa and Gemagota provinces of Ethiopia. There were 41 participants — 33 were from the lowland group and the remainder were from the highland group. This is significant as each section of the community had exposure to different animals and different external experiences, such as going to market. The sample consisted of approximately equal numbers of men, women, boys and girls.</li> <li>The procedure involved participants being presented with three pictures printed in black and white ink on coarse whitish cloth (a material familiar to the community). The first picture was of a standing buck; the second was of a running leopard; and the last was a hunting scene similar to that used in Hudson's (1960) pictorial perception test. Participants were tested individually and shown the pictures in the same order. As the pictures were presented, participants were asked open-ended interview questions about the pictures, e.g. 'What do you see?' All responses were recorded, as well as observations of the participants' demeanour while answering.</li> <li>The results showed that the participants were able to recognise correctly, albeit gradually and with a degree of effort, the clearly depicted animals. There were some differences observed between the highland and lowland groups, which may have been due to the lowland group's greater familiarity with some of the animals depicted.</li> <li>The researchers concluded that perception is mostly based on the perceiver's past experience or familiarity with an object, animal or person, and that this skill can be learnt with effort.</li> </ul>	<ul style="list-style-type: none"> <li>This study is written for an academic audience and would not be easily accessible to students.</li> <li>The study provided experimental evidence in light of previous observations about pictorial recognition in remote populations.</li> <li>A strength of the study is that the interviews were conducted by an experimenter who was familiar with the area, the people and their language, and with the help of a local research assistant. This increased the internal validity of the research.</li> <li>A limitation of the experiment is that some of the participants seemed to experience stressful responses during the experiment. This may have violated ethical principles.</li> <li>Additionally, experimenters tended to get different responses from the participants depending on whether the cloth was lying flat on the ground (horizontal) or hung up (vertical). This may have been an uncontrolled extraneous variable in the experiment.</li> <li>The use of pictures in black and white might also have affected participant responses. Some participants had difficulty identifying the tree. Many participants reported seeing a 'zebra' in one of the pictures. This may have been an uncontrolled extraneous variable.</li> <li>The study could be used to evaluate the impact of social influences on visual perception.</li> </ul>	
<p><b>Bibliographic citation:</b> Bugelski, BR &amp; Alampay, DA 1961, 'The role of frequency in developing perceptual sets', <i>Canadian Journal of Psychology</i>, vol. 15, no. 4, pp. 205–211, doi:10.1037/h0083443.</p>		
<ul style="list-style-type: none"> <li>Commonly known as the 'rat-man experiment', this is a key piece of research that has often been described as a defining point in our understanding of visual perception.</li> <li>The researchers aimed to identify the importance of experience on perceptual sets (past experience, context, motivation and emotional state).</li> <li>They used an ambiguous picture of a 'rat-man' (see picture on p. 206) as the key part of their investigation. Participants' prior experiences were altered as the independent variable — they were shown either a picture of a man or a picture of a rat prior to exposure to the rat-man image. During an initial phase of testing all participants were asked, without prompting, what they saw in the picture.</li> <li>Of the 45 participants, 81% saw a man, suggesting a natural bias for viewing human faces by individuals. The research used a mixed-measures design as each participant was used as their own control group prior to being exposed to either the man picture or the rat picture.</li> <li>The results found higher identification of the ambiguous image as a rat from participants who were shown images of rats prior to viewing.</li> <li>It was concluded that related experience can alter a person's perception and perceptual set on the rat-man image.</li> </ul>	<ul style="list-style-type: none"> <li>This study could be used to explain psychological influences on visual perception, including perceptual set.</li> <li>Other studies such as Bruner and Minturn's (1955) found similar results, adding to the study's reliability. Psychology's 'rat-man era' was a springboard for the development of key theories in visual perception, including by Allport (1955), who developed theories of visual perception and hypothesised the value of previous experience on visual perception.</li> <li>Limitations of the study included the following. <ul style="list-style-type: none"> <li>The use of a mixed-measures design was not ideal, as it may have primed participants for the real aim of the research.</li> <li>The conditions were not counterbalanced as part of the repeated measures design, which may have affected the results in terms of order effects.</li> </ul> </li> <li>This article could be used as a starter activity about experience and its effect on perception.</li> </ul>	<ul style="list-style-type: none"> <li>Bruner, JS &amp; Minturn, AL 1955, 'Perceptual identification and perceptual organization', <i>Journal of General Psychology</i>, vol. 53, pp. 21–28, doi:10.1080/00221309.1955.9710133</li> <li>Allport, FH 1955, <i>Theories of Perception and the Concept of Structure</i>, Wiley, New York.</li> </ul>

Annotation	Evaluation	Similar/related research
<b>Bibliographic citation:</b> Hubel, DH & Wiesel, TN 1979, 'Brain mechanisms of vision', <i>Scientific American</i> , vol. 241, no. 3, pp. 150–162, <a href="https://doi.org/10.1038/scientificamerican0979-150">doi:10.1038/scientificamerican0979-150</a> .		
<ul style="list-style-type: none"> <li>David Hubel and Torsten Wiesel were winners of the Nobel Prize in Physiology or Medicine 1981 for their discoveries in neuroscience (they also shared the award with Roger Sherry). Their key piece of research was on the brain processes involved in vision. Their research is still relevant, and remains largely unchanged.</li> <li>This article describes the functions of key parts of the brain used in visual perception. For example, Hubel and Wiesel identified that the primary visual cortex processes images from the opposite side of the visual field. They discovered this using cortical mapping projections.</li> <li>They also identified that the image produced by cortical projection was rudimentary, and therefore other regions of the brain must also take an active role in visual perception.</li> <li>The groundbreaking finding from this research was that the visual cortices work only locally, on portions of what is seen in the environment. In order to complete the image, experience and cognitions are processed in other regions of the brain in order for visual perception to occur.</li> </ul>	<ul style="list-style-type: none"> <li>This article is also relevant to Topic 1: Localisation of function in the brain.</li> <li>The past 20 years, including modern technological advances, have supported the validity and reliability of Hubel and Wiesel's research.</li> <li>As a teaching resource, Hubel and Wiesel's research             <ul style="list-style-type: none"> <li>has the limitation that it does not consider the most up-to-date technology or neuro-structural information that is part of visual processing</li> <li>could be used to explain the process of visual perception, with reference to                 <ul style="list-style-type: none"> <li>reception (visible light spectrum)</li> <li>transduction (photoreceptors, receptive fields)</li> <li>transmission (visual cortex)</li> <li>selection (feature detectors)</li> <li>organisation and interpretation (visual perception principles).</li> </ul> </li> </ul> </li> </ul>	<p>—</p>
<b>Topic 3: Memory</b>		
<b>Bibliographic citation:</b> Baddeley, AD & Hitch, G 1974, 'Chapter: Working memory', in Bower, GH (ed.), <i>The Psychology of Learning and Motivation</i> , vol. 8, pp. 47–89, <a href="https://doi.org/10.1016/S0079-7421(08)60452-1">doi:10.1016/S0079-7421(08)60452-1</a> .		
<ul style="list-style-type: none"> <li>Alan Baddeley is a Professor of Psychology and Graham Hitch is an Emeritus Professor of Psychology at the University of York, UK. They are well known for their work in developing the 'working model of memory'.</li> <li>Atkinson and Shiffrin's (1968) multi-store model of memory was very successful in terms of the amount of research it generated. However, it was highly criticised for being too simplistic, especially when it came to the characteristics of short-term memory.</li> <li>In response to Atkinson's and Shiffrin's model, Baddeley and Hitch developed an alternative model for the components of short-term memory called the 'working model of memory'. This model, which proposed that there were different systems for different types of information, differed from the original model of short-term memory, which proposed that all information went into a single store.</li> <li>The working model of memory was said to consist of three stores: the central executive, the visuo-spatial sketchpad (inner eye) and the phonological loop.</li> <li>The central executive was said to             <ul style="list-style-type: none"> <li>drive the whole system, and allocate data to the subsystems: the visuo-spatial sketchpad and phonological loop</li> <li>deal with cognitive tasks, such as mental arithmetic and problem-solving.</li> </ul> </li> <li>The visuo-spatial sketchpad (inner eye) was said to store and process information in a visual or spatial form.</li> <li>The phonological loop was said to             <ul style="list-style-type: none"> <li>deal with spoken and written material</li> <li>have two parts — the phonological store, which was linked to speech perception, and the articulatory control process, which was linked to speech production.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>The study is quite comprehensive and cumbersome to read, so it may be preferable for students to use a website that summarises the components for them.</li> <li>The theoretical model of memory was developed in response to research Baddeley and Hitch conducted that found the existing model of short-term memory was too simplistic. It is very well known and supported by empirical evidence.</li> <li>A strength of the model is that it has generally gained research support since its discovery and it is supported by considerable experimental evidence, including case studies and dual-task studies.</li> <li>The working model of memory can be applied to real-life tasks, such as reading (phonological loop), problem-solving (central executive) and navigation (visual and spatial processing).</li> <li>Components of the model are criticised by some researchers, e.g. the visuo-spatial sketchpad implies that all spatial information is first visual, but this does not fit with what researchers have discovered about how people with vision impairments use spatial awareness.</li> <li>There is little direct evidence of how the central executive works. The capacity of the central executive has never been measured.</li> <li>In 2000, the original model of working memory was updated in response to years of research findings. An additional component, called the episodic buffer, was added. The episodic buffer is said to act as a 'backup' store, which communicates with both long-term memory and components of short-term memory.</li> <li>This study could be used to evaluate the working model of memory.</li> </ul>	<ul style="list-style-type: none"> <li>Atkinson, RC &amp; Shiffrin, RM 1968, 'Chapter: Human memory: A proposed system and its control processes', in Spence, KW &amp; Spence, JT (eds), <i>The Psychology of Learning and Motivation</i>, vol. 2, Academic Press, New York, pp. 89–195, <a href="https://doi.org/10.1016/S0079-7421(08)60422-3">doi:10.1016/S0079-7421(08)60422-3</a></li> <li>Baddeley, AD 2000, 'The episodic buffer: A new component of working memory?', <i>Trends in Cognitive Sciences</i>, vol. 4, no. 11, pp. 417–423, <a href="https://doi.org/10.1016/S1364-6613(00)01538-2">doi:10.1016/S1364-6613(00)01538-2</a></li> </ul>

Annotation	Evaluation	Similar/related research
<p><b>Bibliographic citation:</b> Grant, HM, Bredahl, LC, Clay, J, Ferrie, J, Groves, JE, McDorman, TA &amp; Dark, VJ 1998, 'Context-dependent memory for meaningful material: Information for students', <i>Applied Cognitive Psychology</i>, vol. 12, no. 6, pp. 617–623, doi:10.1002/(SICI)1099-0720(1998120)12:63.0.CO;2-5.</p> <ul style="list-style-type: none"> <li>• The authors of this study were all researchers at Iowa State University. They sought to establish whether memory is context-dependent, i.e. whether memory is improved when it is tested in the same environment in which the information was learnt.</li> <li>• They recruited 40 participants aged 17 to 59 years (17 female and 23 male), using a snowball sampling technique.</li> <li>• Participants were asked to read an article in silent or noisy conditions. Their reading comprehension was then assessed under either silent or noisy conditions. The researchers used a combination of multiple-choice (recognition) and short-answer (recall) questions.</li> <li>• Performance was found to be better in the matching conditions (silent reading–silent test and noisy reading–noisy test) than in the mismatching conditions (silent reading–noisy test and noisy reading–silent test).</li> <li>• The researchers concluded that environmental context appears to be important in the retrieval of newly learnt meaningful information. This finding had implications for students and study environments.</li> </ul>	<ul style="list-style-type: none"> <li>• This study <ul style="list-style-type: none"> <li>– is quite accessible to a student audience</li> <li>– is identified in the syllabus as a mandatory practical</li> <li>– is highly replicable and applicable to student life, as the research methods used provide context for generalisation to similar environments, giving it high ecological validity</li> <li>– contains tables of descriptive results, which could be used when discussing data processing techniques with students</li> <li>– has the strength that the age of the sample was quite variable, suggesting that the result may not be age-dependent</li> <li>– has the limitation that it used a relatively small sample size (n = 39), reducing its population validity. Additionally, researchers used an independent groups design with a small total number of participants, which means the results could have been subject to individual participant differences</li> <li>– could be used to investigate the effect of learning environment on memory</li> <li>– could be used to evaluate the levels of processing (LOP) model of memory, including the role of encoding in long-term memory.</li> </ul> </li> </ul>	<p>—</p>
<p><b>Bibliographic citation:</b> Corkin, S, Amaral, DG, Gonzalez, RG, Johnson, KA &amp; Hyman, BT 1997, 'HM's medial temporal lobe lesion: Findings from magnetic resonance imaging', <i>The Journal of Neuroscience</i>, vol. 17, no. 10, pp. 3964–3979, doi:10.1523/JNEUROSCI.17-10-03964.1997.</p> <ul style="list-style-type: none"> <li>• Susan Corkin is a leading scholar in neurophysiology and cognitive neuroscience and is a professor in the Department of Brain and Cognitive Sciences and the Clinical Research Center at the Massachusetts Institute of Technology, USA.</li> <li>• This study focused on a patient given the pseudonym HM. HM is perhaps the most studied person in behavioural neuroscience.</li> <li>• At the age of nine, HM was knocked down by a bicycle. From that point on, he suffered from severe epilepsy. At the age of 27, HM underwent a bilateral medial temporal lobe resection (an operation that removed parts of the brain, including both hippocampi), performed by Dr William Scoville. The experimental operation resulted in HM suffering from severe anterograde amnesia, that affected his ability to commit new events to his explicit memory and persisted until his death.</li> <li>• In 1992, when HM was 66 years of age, the researchers used magnetic resonance imaging (MRI) technology to investigate the structure of HM's brain to <ul style="list-style-type: none"> <li>– determine the damage to the medial temporal lobe structures</li> <li>– document any other possible brain lesions.</li> </ul> </li> <li>• The results of the MRI indicated that Dr Scoville had removed the entire medial temporal cortex of HM's brain.</li> <li>• This research confirmed that the lesions responsible for the amnesic syndrome in HM were confined to the medial temporal lobe, and that this area of the brain clearly contributes to normal memory function.</li> </ul>	<ul style="list-style-type: none"> <li>• This paper is written with medical language focusing on neuroimaging technology and would be difficult for students to interpret. However, there are many references to other case-study patients that could be used with students.</li> <li>• This research is reliable as it uses objective measurement (MRI) to confirm surgical reports and other research findings about changes to HM's brain. It is also supported by similar findings from animal studies.</li> <li>• A strength of MRI technology is that it limits possible researcher bias.</li> <li>• A limitation of the research is that it was only carried out on one person, so it is difficult to generalise the findings from the case study to other populations of people.</li> <li>• This research could be used to describe the role of the hippocampus in memory formation and storage.</li> </ul>	<ul style="list-style-type: none"> <li>• Scoville, WB &amp; Milner, B 1957, 'Loss of recent memory after bilateral hippocampal lesions', <i>Journal of Neurology, Neurosurgery &amp; Psychiatry</i>, vol. 20, no. 1, pp. 11–21, doi:10.1136/jnnp.20.1.11</li> </ul>
<p><b>Bibliographic citation:</b> Peterson, LR &amp; Peterson, MJ 1959, 'Short-term retention of individual verbal items', <i>Journal of Experimental Psychology</i>, vol. 58, no. 3, pp. 193–198, doi:10.1037/h0049234.</p> <ul style="list-style-type: none"> <li>• Lloyd and Margaret Peterson were researchers at the Department of Psychological and Brain Sciences at Indiana University, USA. Their groundbreaking investigation into forgetting is still widely cited in textbooks today.</li> <li>• The researchers sought to investigate how information in short-term memory decays over time if rehearsal is prevented.</li> <li>• 24 participants were recruited using convenience sampling, and were asked to remember short lists of trigrams (meaningless three-consonant syllables, e.g. CLX) while counting backwards, out loud, by threes (942 ... 939 ... 936 ...). The counting task prevented participants from silently repeating the letters to themselves (rehearsal). The experiment used a repeated measures design, as participants were tested eight times at recall intervals of 3, 6, 9, 12, 15 and 18 seconds.</li> <li>• The researchers found that the longer the recall interval, the fewer trigrams were recalled. Participants were able to recall 80% of trigrams after a three-second delay; however, after 18 seconds fewer than 10% of trigrams were recalled correctly.</li> <li>• They concluded that short-term memory has a limited duration when rehearsal is prevented. It is thought that this information is lost from short-term memory due to trace decay.</li> </ul>	<ul style="list-style-type: none"> <li>• This study <ul style="list-style-type: none"> <li>– uses sophisticated language that may be difficult for students to interpret</li> <li>– was the first to investigate forgetting in short-term memory. The use of an experimental method meant that researchers could form a conclusion to their research question</li> <li>– has the limitations of <ul style="list-style-type: none"> <li>▪ low ecological validity, as it was highly artificial</li> <li>▪ a small sample size (n = 24), meaning its conclusions should be taken with caution</li> </ul> </li> <li>– has the strength that the study has been repeated numerous times with very similar findings</li> <li>– could be used to recognise the duration of short-term memory.</li> </ul> </li> </ul>	<p>—</p>

Annotation	Evaluation	Similar/related research
<p><b>Bibliographic citation:</b> Miller, GA 1956, 'The magical number seven, plus or minus two: Some limits on our capacity for processing information', <i>Psychological Review</i>, vol. 63, no. 2, pp. 81–97, doi:10.1037/h0043158.</p> <ul style="list-style-type: none"> <li>• George Miller was an American psychologist and one of the founders of cognitive psychology. Miller wrote several books and authored this famous paper, which is frequently cited in psychology and wider culture.</li> <li>• This paper outlines Miller's theory and presents supporting research. Miller's theory states that short-term memory <ul style="list-style-type: none"> <li>– has a limited capacity</li> <li>– has a limited duration</li> <li>– uses a process called encoding.</li> </ul> </li> <li>• Through experimentation, Miller sought to determine the capacity of short-term memory. This paper is a review of several studies that examined the capacity of short-term memory to distinguish tones, frequencies, taste, visual objects, colour and several other features.</li> <li>• The researchers found fairly consistent results from all these experiments: the capacity of short-term memory (or immediate memory as it was then known) is limited to seven bits of information, plus or minus two. Miller also asserted that the capacity of short-term memory can be increased by grouping bits of information into 'chunks'.</li> </ul>	<ul style="list-style-type: none"> <li>• This paper <ul style="list-style-type: none"> <li>– is cumbersome to read and not suitable for a student audience due to its technical and antiquated terminology</li> <li>– is a review of experiments by other researchers that are presented in support of Miller's theory. In this sense, the review is quite reductionist — it does not present any opposing or non-complementary evidence</li> <li>– gives little detail about the experiments, so it is difficult to evaluate the methodologies used or assess their validity or reliability</li> <li>– could be used to recognise the capacity of short-term memory.</li> </ul> </li> <li>• Miller's theory has historical validity — experimentation over time has shown the findings to be reliable.</li> <li>• Any of the experiments referenced in the paper could be used to demonstrate the 'magic' number seven with students.</li> </ul>	<p>—</p>
<p><b>Bibliographic citation:</b> Craik, FIM &amp; Levy, BA 1970, 'Semantic and acoustic information in primary memory', <i>Journal of Experimental Psychology</i>, vol. 86, no. 1, pp. 77–82, doi:10.1037/h0029799</p> <ul style="list-style-type: none"> <li>• Fergus Craik is a cognitive psychologist known for his groundbreaking research on the levels of processing in memory. Betty Ann Levy is a leading researcher in cognitive psychology at McMaster University, Canada.</li> <li>• This study sought to determine whether semantic-associative attributes could facilitate free recall from primary memory (the term used to describe short-term memory at the time).</li> <li>• 85 participants were recruited using convenience sampling. They were presented with a cluster of six words, which were related either acoustically (e.g. pillow, fellow, hollow, shallow, wallow, yellow) or semantically, e.g. stomach, ankle, shoulder, muscle, kidney, elbow. The words were placed in the middle or at the end of free recall lists. Participants' recall scores were calculated for the acoustic, semantic and control lists.</li> <li>• The researchers found evidence of both the primacy and recency effects in their data. They found that both acoustic and semantic similarity were detrimental to primary (short-term) memory recall (although only the later effect was statistically reliable). It was suggested that similarity between the words gave rise to lower recall in short-term memory because similarity tends to cause confusion, which reduces the efficiency of recall. The researchers also suggested that there is some form of semantic encoding that occurs in short-term memory. This was contrary to previous research findings.</li> <li>• Both semantic and acoustic similarity were found to facilitate secondary (long-term) memory. The researchers suggested that too much emphasis had been given to semantic processing in long-term memory over other types of encoding.</li> </ul>	<ul style="list-style-type: none"> <li>• The study uses outdated language to describe different memory stores, which may be confusing for students. When using this study, care should be taken to use accurate terminology when describing memory.</li> <li>• This study <ul style="list-style-type: none"> <li>– could be used to evaluate the LOP model of memory</li> <li>– determined something that no other researchers at the time had found: that primary (short-term) and secondary (long-term) memory use different types of encoding</li> <li>– determined that semantic encoding occurs not just in secondary memory, but also in primary memory</li> <li>– used a repeated measures design, which decreases the influence of individual participant differences, but can be open to practice and fatigue effects</li> <li>– used statistical inference to determine statistical significance, which increased the validity and reliability of the reported findings.</li> </ul> </li> <li>• A strength of the study is its use of an experimental method to determine a cause-and-effect relationship. This increased the validity and reliability of the conclusions drawn. It also had a large participant sample (n = 85).</li> </ul>	<p>—</p>
<p><b>Bibliographic citation:</b> Tulving, E &amp; Pearlstone, Z 1966, 'Availability versus accessibility of information in memory for words', <i>Journal of Verbal Learning and Verbal Behavior</i>, vol. 5, no. 4, pp. 381–391, doi:10.1016/S0022-5371(66)80048-8.</p> <ul style="list-style-type: none"> <li>• Endel Tulving is an experimental psychologist and cognitive neuroscientist whose research focus was primarily on human memory. When this study was published, Zena Pearlstone was Tulving's research assistant at the University of Toronto, Canada.</li> <li>• The researchers sought to determine whether failure to recall previously learnt information was due to trace decay or inaccessibility due to a failure to find the information in the association network (memory).</li> <li>• They recruited 948 high school students from grades 10 to 12 from a number of schools in the Toronto area. Participants were presented with nine lists of categorised words (e.g. countries in Europe, boy's names). Lists varied in terms of category names and words. Three independent variables were manipulated: list length, number of words per category, and conditions of recall (either cued or non-cued).</li> <li>• A significant result was that the presence of cues increased recall in all nine lists (<math>p &lt; 0.01</math>).</li> <li>• The researchers concluded that the superiority of the cued condition suggests that accessibility of information in memory clearly depends on availability, but also on retrieval cues.</li> </ul>	<ul style="list-style-type: none"> <li>• This study was one of the first to look at the effect of retrieval cues on recall. It established some of the theory in this area of research.</li> <li>• The study had strong reliability and validity as it used a large sample size and was a highly controlled experimental study.</li> <li>• A limitation of the study was that researchers were unable to determine whether participants recalled less in the non-cued condition because they did not store the information in the first instance, or they simply could not retrieve it when asked. This limits the conclusions that can be drawn from the research.</li> <li>• Additionally, it appeared that participants using the longer word lists established their own categories for some words, and this technique may have also affected the results of the experiment.</li> <li>• The study is easily replicable in a classroom setting, e.g. by making the independent variable the presence or absence of cues in a standard list.</li> <li>• The study could be used to <ul style="list-style-type: none"> <li>– recognise the duration and capacity of short-term memory</li> <li>– evaluate the LOP model of memory, including the role of encoding in long-term memory.</li> </ul> </li> </ul>	<p>—</p>

Annotation	Evaluation	Similar/related research
<p><b>Bibliographic citation:</b> Elias, CS &amp; Perfetti, CA 1973, 'Encoding task and recognition memory: The importance of semantic encoding', <i>Journal of Experimental Psychology</i>, vol. 99, no. 2, pp. 151–156, doi:10.1037/h0034644.</p> <ul style="list-style-type: none"> <li>• Cherin Elias and Charles Perfetti work out of the Learning Research and Development Center, University of Pittsburgh, USA. The paper was submitted as part of Elias's master's thesis with Perfetti as her supervisor.</li> <li>• The aim of the research was to <ul style="list-style-type: none"> <li>– devise a test that allowed the researchers to control the encoding process undertaken by participants</li> <li>– measure the type of encoding used in short-term and long-term memory.</li> </ul> </li> <li>• 64 participants were assigned to one of four instructional groups: associative, synonym, acoustic and learning. All participants were presented with a series of stimulus words for 10 seconds each. Participants in the <ul style="list-style-type: none"> <li>– associative group were instructed to give as many single-word free associates (e.g. related words) as possible</li> <li>– synonym group were asked to give synonyms or words that were 'very close in meaning' to the stimulus word</li> <li>– acoustic group were asked to respond with words that 'sound like' the stimulus, e.g. bird, word, herd</li> <li>– learning group were told to 'learn the words', but the nature of the test was not specified.</li> </ul> </li> <li>• All participants were then presented with a recognition list of words (actual stimulus words and distractors) and asked to indicate yes/no for recognition of the word and rate their confidence on a three-point scale.</li> <li>• The researchers found that <ul style="list-style-type: none"> <li>– instructions (e.g. associative, synonym) affected overall participant performance and direction of distraction</li> <li>– associative and learning groups falsely recognised semantic distractors, while the acoustic group falsely recognised only acoustic distractors</li> <li>– the synonym group was not distracted by any word type</li> <li>– participants in the synonym, associative and learning conditions had the highest recognition scores, whereas participants in the acoustic condition typically had the lowest recognition scores.</li> </ul> </li> <li>• The researchers concluded that the general order of performance among groups reflected the differential tendency of the instructions to encourage a semantic focus.</li> </ul>	<ul style="list-style-type: none"> <li>• This study uses sophisticated academic language and so parts of it would not be accessible to students.</li> <li>• The researchers built on previous research findings to devise a more reliable test of encoding in different memory stores.</li> <li>• A strength of this study is that it used an experimental methodology that allowed cause-and-effect conclusions to be drawn.</li> <li>• A limitation of the study is that it was conducted in a laboratory and was highly artificial, suggesting low ecological validity.</li> <li>• To analyse their results, the researchers used a combination of statistical tests of inference. These tests are beyond what is expected of students at a school level; however, their reporting of <i>p</i>-values could be used as a learning experience.</li> <li>• Aspects of the methodology could be modified to be suitable for an in-class practical or student experiment.</li> <li>• This study could be used to evaluate the LOP model of memory, including the role of encoding in long-term memory.</li> </ul>	<p>—</p>
<p><b>Bibliographic citation:</b> Hyde, TS &amp; Jenkins, JJ 1973, 'Recall for words as a function of semantic, graphic, and syntactic orienting tasks', <i>Journal of Verbal Learning and Verbal Behavior</i>, vol. 12, no. 5, pp. 471–480, doi:10.1016/S0022-5371(73)80027-1.</p> <ul style="list-style-type: none"> <li>• Thomas Hyde was a researcher who worked out of Case Western Reserve University. James Jenkins is a researcher from the University of Minnesota, USA.</li> <li>• Their previous research sought to investigate <ul style="list-style-type: none"> <li>– the differences between free recall and incidental learning</li> <li>– the use of different types of tasks (acoustic, syntactic and semantic)</li> <li>– how these correlate with recall.</li> </ul> </li> <li>• This paper sought to refine some of their earlier work to yield reasonable predictions about recall.</li> <li>• The researchers recruited undergraduate students in first-year psychology. The number of subjects per group ranged from 19 to 33.</li> <li>• The researchers used two types of word lists: associated and unrelated. The control group was instructed to simply remember the words. The other participants were assigned to one of five orienting tasks <ul style="list-style-type: none"> <li>– pleasant–unpleasant (rating words on their pleasantness or unpleasantness on a simple five-point rating scale)</li> <li>– estimating the frequency of usage (rating the frequency with which the words are used in the English language on a five-point rating scale from frequent to infrequent)</li> <li>– E–G checking (detecting the occurrence of the letters 'E' and 'G' in the spelling of stimulus words)</li> <li>– parts of speech (recording whether the words were nouns, verbs, adjectives or 'some other' part of speech)</li> <li>– sentence frames (when presented with two sentences, determining whether the word fitted either of the sentence frames: 'It is ...' or 'It is the ...').</li> </ul> </li> <li>• Each word was presented for a three-second interval. Once all words were presented, participants had five minutes for free recall.</li> <li>• The researchers found that <ul style="list-style-type: none"> <li>– there was higher recall for associated words than for unrelated words</li> <li>– the semantic orienting tasks (i.e. frequency of usage and pleasant–unpleasant conditions) yielded much higher recall than the non-semantic tasks (sentence frame, E–G checking, part of speech)</li> <li>– participants in the semantic condition performed just as well as (if not better than) the participants in the control group</li> <li>– the intention to learn was only important with the associated list.</li> </ul> </li> <li>• The researchers concluded that future research should focus more on the processes involved in tasks rather than the responses involved in the tasks.</li> </ul>	<ul style="list-style-type: none"> <li>• This study is quite accessible to a student audience.</li> <li>• This experiment built on previous research in the field to increase the validity and reliability of research into memory.</li> <li>• A strength of the study was that it used a large sample size. This decreased the potential for bias due to individual participant differences.</li> <li>• A limitation of the study was that the participants were all undergraduates from universities in the USA. This decreased the population validity.</li> <li>• The experiment was carried out in a laboratory setting and used a control group, so the researchers were able to draw cause-and-effect conclusions. However, the experiment's ecological validity was limited due to its artificial nature.</li> <li>• This study <ul style="list-style-type: none"> <li>– helps to demonstrate different types of encoding and could be applied to improve study techniques in the classroom</li> <li>– could be used to evaluate the LOP model of memory, including the role of encoding in long-term memory.</li> </ul> </li> </ul>	<p>—</p>

Annotation	Evaluation	Similar/related research
<p><b>Bibliographic citation:</b> Craik, FIM &amp; Tulving, E 1975, 'Depth of processing and the retention of words in episodic memory', <i>Journal of Experimental Psychology: General</i>, vol. 104, no. 3, pp. 268–294, doi:10.1037/0096-3445.104.3.268</p>		
<ul style="list-style-type: none"> <li>• Fergus Craik is a cognitive psychologist known for his groundbreaking research on levels of processing in memory. Endel Tulving is an experimental psychologist and cognitive neuroscientist whose research helped separate episodic memory into two distinct parts. This article details 10 experiments that aimed to investigate how deep and shallow processing affect memory recall.</li> <li>• The number of participants in each experiment ranged from 12 to 36. All participants were undergraduate students who were paid for their participation. Most research designs were independent groups.</li> <li>• The independent variable usually consisted of a question stem that elicited the type of processing required (structural, phonetic or semantic). The dependent variable was always recall.</li> <li>• Participants were <ul style="list-style-type: none"> <li>– asked question stems designed to elicit different levels of encoding (shallow to deep)</li> <li>– shown a common noun</li> <li>– asked to indicate yes or no to the question preceding the word</li> <li>– given a surprise recall test.</li> </ul> </li> <li>• The researchers found that <ul style="list-style-type: none"> <li>– the shallowest processing (and therefore the lowest levels of recall) occurred when structural questions were asked, e.g. 'Is the word in capital letters?'</li> <li>– intermediate levels of encoding were found for phonetic questions, e.g. 'Does the word rhyme with weight?'</li> <li>– the deepest processing (and therefore the questions that elicited the greatest level of recall) were those that used semantic processing, e.g. 'Would the word fit into this sentence: "He met a ____ in the street"?' </li> </ul> </li> <li>• The researchers concluded that retention depends critically on the qualitative nature of the encoding performed.</li> </ul>	<ul style="list-style-type: none"> <li>• This lengthy paper details 10 separate experiments that provided empirical evidence in support of the depth of processing theory of memory.</li> <li>• A strength of these experiments is that the variables tested were tightly controlled, and researchers used appropriate analysis techniques in order to draw conclusions.</li> <li>• The experiments population validity was limited by its use of a relatively small sample (n &lt; 40), which consisted primarily of paid university students.</li> <li>• The experiments could be used to <ul style="list-style-type: none"> <li>– show students how a simple research question can lead to the exploration of many different variables</li> <li>– evaluate the LOP model of memory, including the role of encoding in long-term memory</li> <li>– distinguish between recall, recognition and relearning</li> <li>– discuss strategies to improve memory, including <ul style="list-style-type: none"> <li>▪ chunking</li> <li>▪ rehearsal (maintenance and elaborative)</li> <li>▪ mnemonics (e.g. the method of loci and SQ4R method — survey, question, read, recite, relate and review).</li> </ul> </li> </ul> </li> </ul>	<p>—</p>
<p><b>Topic 4: Learning</b></p>		
<p><b>Bibliographic citation:</b> Pavlov, IP 1897, <i>The Work of the Digestive Glands</i>, Griffin, London.</p>		
<ul style="list-style-type: none"> <li>• Ivan Pavlov was a Russian physiologist known for his theory of classical conditioning. His work was awarded the Nobel Prize in Physiology or Medicine in 1904.</li> <li>• Classical conditioning (or Pavlovian conditioning, as it is sometimes known) has received empirical support and is used in modern experimental, clinical and educational settings. This book details the experiments conducted by Pavlov that allowed him to devise this theory.</li> <li>• Pavlov was curious about why the dogs in his laboratory salivated whenever he entered the room. To investigate this phenomenon, Pavlov designed an apparatus to present a dog with food through a screen. Pavlov paired presenting the food with ringing a bell (this was known as the conditioning phase).</li> <li>• After a series of trials, Pavlov would simply ring the bell without presenting food. At all stages of the experiment, Pavlov measured the dog's salivary secretions.</li> <li>• Pavlov found that the dog would salivate at the ringing of the bell only, meaning that the dog had learnt to associate the bell with the food.</li> <li>• Pavlov devised some key terminology for this phenomenon <ul style="list-style-type: none"> <li>– <i>unconditioned stimulus</i> (the food)</li> <li>– <i>unconditioned response</i> (salivation), which was caused by the unconditioned stimulus</li> <li>– <i>neutral stimulus</i> (the bell, before it began to produce a response in the dog)</li> <li>– <i>conditioned stimulus</i> (the bell, once the dog had learnt to associate the bell with the food)</li> <li>– <i>conditioned response</i> (salivation), which was caused by the conditioned stimulus.</li> </ul> </li> <li>• Over subsequent trials, Pavlov found that for associations to be made, the two stimuli had to be presented together in time. He called this the law of temporal contiguity.</li> <li>• Other terms devised by Pavlov in relation to classical conditioning are <ul style="list-style-type: none"> <li>– <i>extinction</i>, which is the dying out of a conditioned response by breaking the association between the conditioned stimulus and the unconditioned stimulus</li> <li>– <i>spontaneous recovery</i>, which is the return of a conditioned response (usually in a weaker form) after a period of time.</li> </ul> </li> <li>• Through subsequent experimentation, Pavlov determined that similar conditioned stimuli (e.g. any bell) can cause a response (<i>generalisation</i>). In some cases, the stimuli were different enough to elicit no response (<i>discrimination</i>).</li> </ul>	<ul style="list-style-type: none"> <li>• Classical conditioning is a behaviourist theory. This theory states that all behaviour is learnt. It emphasises the importance of learning and environment, and supports the role of nurture over nature.</li> <li>• A strength of the theory is that it is seen to be scientific, since it can be tested using an experimental method. Subsequent years of empirical evidence provide support for the theory as one way to explain behaviour.</li> <li>• Limitations of Pavlov's study include <ul style="list-style-type: none"> <li>– that it was conducted with animals, not humans</li> <li>– that it may lack historical validity (the book was first published in 1897).</li> </ul> </li> <li>• The theory has been criticised for being too simple and reductionist, as it underestimates the complexity of human behaviour, i.e. not all behaviour can be explained by classical conditioning.</li> <li>• The experimentation using Pavlov's dogs is a famous and seminal psychological study. It could be used to <ul style="list-style-type: none"> <li>– teach the concepts within classical conditioning (<b>Note:</b> The study of 'Little Albert' by Watson &amp; Rayner (1920) demonstrates classical conditioning in a human context)</li> <li>– help students understand the terms <i>unconditioned stimulus</i> (UCS), <i>unconditioned response</i> (UCR), <i>neutral stimulus</i> (NS), <i>conditioned stimulus</i> (CS) and <i>conditioned response</i> (CR)</li> <li>– distinguish between stimulus <i>generalisation</i> and <i>discrimination</i></li> <li>– describe <i>extinction</i> and <i>spontaneous recovery</i></li> <li>– compare classical conditioning, operant conditioning and social learning theory.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Watson, JB &amp; Rayner, R 1920, 'Conditioned emotional reactions', <i>Journal of Experimental Psychology</i>, vol. 3, no. 1, pp. 1–14, doi:10.1037/h0069608</li> </ul>



Annotation	Evaluation	Similar/related research
<p><b>Bibliographic citation:</b> Skinner, BF 1948, “Superstition” in the pigeon’, <i>Journal of Experimental Psychology</i>, vol. 38, pp. 168–172.</p> <ul style="list-style-type: none"> <li>• BF Skinner was a professor of psychology at Harvard University from 1958 until 1974. Skinner considered free will to be an illusion and saw human action as dependent on consequences of previous actions. He is responsible for articulating the principle of reinforcement and operant conditioning.</li> <li>• This study examined the formation of ‘superstition’ in pigeons. A hungry pigeon was placed in an experimental cage (Skinner box) for a few minutes each day. A food hopper attached to the cage was swung into place so that the pigeon could eat from it. A clock was arranged to present the food hopper at regular intervals, with no reference whatsoever to the bird’s behaviour. Regardless, operant conditioning took place.</li> <li>• For example, if the presentation of the food hopper coincided with a counter-clockwise turn being made by the pigeon, the pigeon continued this behaviour, apparently associating its actions with the outcome. In the study, the pigeons produced varied repeated behaviours, e.g. a thrust of the head into one of the upper corners of the cage, a ‘tossing’ response and pendulum motions.</li> <li>• Operant conditioning is said to have occurred when the pigeon happened to be producing the response at the presentation of the food hopper, and, as a result, the pigeon tended to repeat this response. If the interval before the next presentation was not so great that extinction took place, a second ‘contingency’ was probable, strengthening the response still further as subsequent reinforcement becomes more probable. Therefore, the effect is highly dependent upon the rate of reinforcement. The shorter the intervening interval, the speedier and more marked the conditioning (e.g. an interval of 15 seconds resulted in stronger conditioning than an interval of one minute).</li> <li>• With this experiment Skinner showed how creatures tend to construct meaning or ‘superstitions’, even when cause and effect relationships are not present.</li> </ul>	<ul style="list-style-type: none"> <li>• The theory of operant conditioning provides many opportunities for experimental testing, as is the case with this study.</li> <li>• Strengths of this experiment include that <ul style="list-style-type: none"> <li>– it was conducted in a highly controlled environment, with multiple observers demonstrating a high level of agreement, increasing the reliability of the observations.</li> <li>– multiple trials with varying intervals were conducted, enhancing the validity of the conclusions made by Skinner.</li> </ul> </li> <li>• Limitations of this experiment include that <ul style="list-style-type: none"> <li>– it lacks historical validity as it was conducted in 1948</li> <li>– the paper does not detail the exact apparatus set up and controls necessary for research today.</li> </ul> </li> <li>• Regardless, Skinner’s research into operant conditioning was hugely influential and is the foundation to a significant body of psychological research and research methodologies.</li> </ul>	<p>—</p>
<p><b>Bibliographic citation:</b> Bandura, A 1977, <i>Social Learning Theory</i>, Prentice Hall, Englewood Cliffs, NJ.</p> <ul style="list-style-type: none"> <li>• Albert Bandura is the David Starr Jordan Professor Emeritus of Social Science in Psychology at Stanford University, USA. He has been a researcher for almost six decades and is best known as the originator of social learning theory (renamed social cognitive theory).</li> <li>• This book was a culmination of research that analysed the foundations of human learning. It asserts the willingness of children and adults to imitate behaviour observed in others: in particular, aggression. In the book, Bandura suggests that models are an important source for learning new behaviours and for achieving change in certain settings.</li> <li>• Social learning theory builds on classical and operant conditioning theories by emphasising the importance of observational forms of learning. Bandura suggests that there are three types of modelling stimuli <ul style="list-style-type: none"> <li>– live models (where a person is demonstrating the desirable behaviour)</li> <li>– verbal instruction (where an individual describes the desired behaviour and instructs the participant in how to engage in the behaviour)</li> <li>– symbolic (where modelling occurs by means of the media, and stimuli can be either real or fictional characters).</li> </ul> </li> <li>• Bandura suggests that a number of cognitive and behaviour processes are necessary for learning to occur, including attention, retention, reproduction and motivation. <ul style="list-style-type: none"> <li>– Observers must first attend to the modelled behaviour. In order to reproduce an observed behaviour, the observer must be able to remember the features of the behaviour.</li> <li>– For reproduction, the observer must simply attempt the behaviour. In some cases, it may take the observer many repetitions to reproduce even a portion of the behaviour. This is where effective feedback can have a great impact.</li> <li>– The decision to reproduce the behaviour is dependent on the motivation and expectations of the observer (including anticipated consequences and internal standards).</li> </ul> </li> <li>• Social learning theory has undergone several changes as a result of research since 1977. Most notably, it is now referred to as social cognitive theory.</li> </ul>	<ul style="list-style-type: none"> <li>• Social learning theory provides an insight into how learning takes place in a vast array of situations and circumstances, backed up by scientific studies. Bandura’s social learning theory is a classic theory in cognitive and social psychology. It built on existing theories of classical and operant conditioning, and gave an explanation for how behaviours are learnt through observation.</li> <li>• This book <ul style="list-style-type: none"> <li>– has the strength of giving credence to other psychologists and professionals who had undertaken similar research</li> <li>– has the limitation that it now lacks historical validity, as it was published over 40 years ago</li> <li>– could be used to <ul style="list-style-type: none"> <li>▪ compare classical conditioning, operant conditioning and social learning theory</li> <li>▪ distinguish between modelling and vicarious conditioning in social learning theory.</li> </ul> </li> </ul> </li> <li>• Students could also be introduced to the research of Bandura, Ross and Ross (1961), known as the Bobo doll experiment, which clearly demonstrates each of the cognitive and behaviour processes in social learning theory.</li> </ul>	<ul style="list-style-type: none"> <li>• Bandura, A, Ross, D &amp; Ross, SA 1961, ‘Transmission of aggression through imitation of aggressive models’, <i>Journal of Abnormal and Social Psychology</i>, vol. 63, no. 3, pp. 575–582, doi:10.1037/h0045925</li> </ul>
<p><b>Bibliographic citation:</b> Watson, JB &amp; Rayner, R 1920, ‘Conditioned emotional reactions’, <i>Journal of Experimental Psychology</i>, vol. 3, no. 1, pp. 1–14, doi:10.1037/h0069608.</p> <ul style="list-style-type: none"> <li>• John Watson was an American psychologist who established the psychological school of behaviourism. He pioneered the use of the scientific method in psychological experimentation, and conducted research on animal behaviour, child rearing and advertising.</li> <li>• This study is one of the best-known research experiments undertaken by Watson and his colleague Rosalie Rayner.</li> <li>• The researchers sought to investigate whether emotional responses were the result of reflex or conditioning (learning), i.e. <ul style="list-style-type: none"> <li>– Can fear of an animal be conditioned?</li> <li>– Can this fear then be transferred to other animals or other objects?</li> <li>– What is the effect of time on the conditioned emotional response?</li> <li>– What laboratory methods can be devised to remove the conditioned emotional response?</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• This study <ul style="list-style-type: none"> <li>– is a good demonstration of the scientific method, and the kinds of direct observations that were made in psychology in the 1920s</li> <li>– could be used to distinguish between stimulus generalisation and discrimination in classical conditioning</li> <li>– lacked many of the controls that are expected in modern experiments, and it only had one subject, which restricted the validity of the conclusions made</li> <li>– would be deemed unethical today, especially since there was no</li> </ul> </li> </ul>	<p>—</p>

Annotation	Evaluation	Similar/related research
<ul style="list-style-type: none"> <li>• They recruited a child, referred to as Albert B, whose mother was a wet nurse at the Harriet Land Home for Invalid Children. Albert B was approximately nine months of age at the time of recruitment. Initially, he underwent several tests, involving physical and emotional assessments, including whether he exhibited any fear responses to the trial stimuli, which included a white rat, a rabbit, a dog, a monkey, masks with and without hair, cotton wool and burning newspapers. At no time did Albert B show any fear in any of the situations. To test that Albert B could exhibit a fear response, the researchers produced an unexpected loud sound by striking a hammer on a steel bar. Albert B showed normal infant fear responses, including turning away, throwing up his arms and crying.</li> <li>• The experimentation began when Albert B was 11 months old. The initial conditioning involved presenting Albert B with a white rat. Each time he touched the rat, a bar was struck, causing a fear response. Seven days later, when Albert B was presented with the rat without the sound, he showed no tendency to touch it. The researchers proceeded to present the rat alone and in a pairing with the loud noise. After each presentation and pairing, Albert B displayed signs of the fear response. The researchers concluded that the initial conditioning had occurred (answering the first research question).</li> <li>• Five days later, the researchers began presenting Albert B with other similar stimuli, such as a white rabbit, a dog, a fur coat, cotton wool and a Santa Claus mask. After each presentation, Albert B showed differing degrees of the original fear response (stimulus generalisation), demonstrating that the fear could be transferred to other animals and objects (answering the second research question). The researchers also tested Albert B in locations other than the original laboratory setting, and after a break period of one month. They found a persistence of directly conditioned emotional responses, as well as those conditioned by transfer, although the directly conditioned emotional responses were less intense.</li> <li>• At this stage of the experiment, Albert B was taken from the hospital and researchers were unable to attempt to remove the conditioned responses.</li> <li>• The researchers concluded that it is probable that many of the phobias in psychopathology are true conditioned emotional reactions, which are either direct or transferred (i.e. learnt from others).</li> </ul>	<p>opportunity for the researchers to assess the long-term consequences on Albert B's emotions or behaviour.</p> <ul style="list-style-type: none"> <li>• When this study was published, Freudian psychology was very much in favour. The study's conclusions were considered to directly oppose Freud's theories of infant and adult behaviour.</li> <li>• There are several YouTube videos that show aspects of Albert B's conditioning, which would complement the teaching of this seminal study in psychology.</li> </ul>	