Lindsey Herting, Lincoln High School, Lincoln, NE
Recipient of a 2021 APA TOPSS Charles T. Blair-Broeker Excellence in Teaching Award

APA TOPSS Charles T. Blair-Broeker Excellence in Teaching Award: Lesson Plan

National Standards for High School Psychology Curricula:

- Domain: Scientific Inquiry Domain / Standard Area: Research Methods, Measurement, and Statistics
    1. Research methods and measurements used to study behavior and mental processes
        - 1.1 Describe the scientific method and its role in psychology
        - 1.2 Describe and compare a variety of quantitative (e.g., surveys, correlations, experiments) and qualitative (e.g., interviews, narratives, focus groups) research methods
        - 1.3 Define systematic procedures used to improve the validity of research findings, such as external validity
- Domain: Cognition / Standard Area: Memory
    1. Encoding
        - 1.1 Identify factors that influence encoding
    3. Retrieval
        - 3.3 Discuss the factors influencing how memories are retrieved
        - 3.4 Explain how memories can be malleable

Learning Objectives:

- Student will *know* the following vocabulary terms/concepts:
    - Scientific method
    - Experiment: hypothesis, operational definition, independent variable, dependent variable, confounding variable, experimental design, target population, etc.
    - Schemata
    - Encoding
    - Retrieval
    - Reconstructive Memory
- Students will *understand* the influence schemata have on encoding and retrieving information.
- Students will *be able to* design an experiment to investigate the effects of schemata on human memory.

Lesson Materials/Resources:

- Bartlett Article (Roediger, 2003)
    - https://drive.google.com/file/d/1DviKNCRgO8DNbYIc4qD5E4wAQFonXmjw/view?usp=sharing
- Bartlett Article Questions
    - https://docs.google.com/document/d/1Vla6oMAl6fMbxCWf6nL7NGfWjC7INHuRhAVeUMmH_Pk/edit
- BBC Mind Changers Podcast: Sir Frederic Bartlett
    - https://www.bbc.co.uk/sounds/play/p00f8n47
- Research Proposal: Schemata and Memory
    - https://docs.google.com/document/d/1GSbQ_6P8S1iFcpeKAtWKzr2Kfzv4t5DcNiNOWf-_o2M/edit?usp=sharing

Lesson Plan:
Inquiry-based question to frame the lesson: "How might a schema influence memory, and what challenges do psychologists encounter when studying these cognitive processes?"

- This lesson is designed for two 50 minute class periods but could easily extend to a third day. Prior to beginning the lesson, students should have a general understanding of the experimental method, schema theory, and the process of memory (encoding, storage, and retrieval). This lesson is intended to introduce the connection between schemata and memory and the reconstructive nature of memory in a way that emphasizes (and reviews) the importance of the scientific method.

Day 1:

- Lesson Opener: Begin the lesson by playing a game of "telephone" with students. I typically ask one student (Student 1) to create a 7-8 sentence story and write it down on a piece of paper. Student 1 whispers the story verbatim to Student 2, Student 2 immediately whispers the story in as great of detail as possible to Student 3, and this continues until the last student hears the story. The last student is then asked to immediately write down the story on a sheet of paper. Collect the initial story as well as the final story and read them out loud to the class. Inevitably, the two stories differ greatly. Students are quickly paired up and asked to identify general changes to the two stories (citing specific evidence) and provide a potential explanation for the changes.
    - *Teacher Note: While playing telephone, I play music to create background noise.*
    - *Teacher Note: In a larger class, I will have two stories going to speed up the process. Two students will create two different stories, I split the class in half, and one group hears one story while the other group hears the other story. (Instead of waiting on 25+ students to hear one story, I am waiting on 12-13 students to hear one story.) I then read both groups' stories.*
- Bartlett Article and Questions: After discussing students' responses, transition to the next task by providing students with the Bartlett Article and the Bartlett Article Questions. Have students read the information and answer the related questions. Go over responses when students have completed the task.
    - Teacher Note: Prior to reading the Bartlett article and depending on allotted time, I will ask students to read the War of the Ghosts (https://www.oxfordreference.com/view/10.1093/oi/authority.20110803121021936) folk tale then recall the story in as much detail (and as accurately) as possible.
    - Teacher Note: If time is an issue, have students read the "Introduction" and "Remembering" sections only. In my class, we read these sections as a class and discuss the questions in the handout verbally.
- Lesson Closer/Informal Assessment: Ask students to reflect on a time in which a particular schema may have influenced the encoding or retrieval of a personal memory.
    - *Teacher Note: This could be a student's exit ticket -- students' responses will be discussed at the beginning of the next day's class period.*
- Extension Activity/Homework: have students listen to the BBC Mind Changers podcast focused on Sir Frederic Bartlett's work. This podcast provides students with more depth to Bartlett's methods and findings.

Day 2:

- Lesson Opener: Allow for students to engage in retrieval practice at the beginning of class. Review schema theory and Bartlett's methods in studying memory, then ask for volunteers to share their responses to yesterday's exit ticket/lesson closer.
    - Teacher Note: This is where I directly explain to students the role schemata can play in *encoding* (attention, perception, top-down processing, semantics etc.) and *retrieval* (cues, context, misinformation, reconstruction, etc.) by using students' examples shared with the class -- these examples generate a class discussion that serves as the lesson's lecture.
- Design an Experiment Activity: After review of yesterday's learning and discussion of a schema's impact on encoding and/or retrieval, assign students to "research teams" consisting of 3 - 4 people. Using the Research Proposal handout (adapted from an activity guide [https://drive.google.com/file/d/1gMSR9JiKu7AN1giirB_8II2TIlyKu0Pb/view?usp=sharing PDF pg 23 -24] shared at an APA Summer Institute led by Margaret Davidson), students will be asked to design a research experiment that investigates the effects of schemata on memory. I typically give students 20 minutes for this task. Upon completion, teams present their research proposal to the class. Teams should be prepared to answer questions from their colleagues regarding the design and procedures. After each team pitches their experiment, the class votes to "financially support" one study -- the teacher can specify criteria for voting (creativity, level of control, validity, relevancy etc.).
    - *Teacher Note: Depending on how many groups there are, sharing students' studies could take anywhere from 30 minutes to an hour. This might be an activity that continues into the next day's class period or you might not require every group to present their experiment.*
    - *Teacher Note: If some students struggle with this task, the teacher could provide students with a few examples (Loftus, 1974 or Bransford, 1972; resources are linked in the references) to help students get started.*
- Lesson Closer/Informal Assessment: Ask students to reflect on the unique challenges that cognitive researchers encounter when studying complicated concepts like the relationship between memory and schemata.
- Extension Activity:
    - Have students read a summary of a controlled lab experiment that explored schemata and memory (examples include Loftus and Palmer, 1974 or Bransford and Johnson, 1972; resources are linked in the references) -- have them compare/contrast the methods and findings of these studies with Bartlett's work.
    - Ask students to contemplate real world consequences of the interplay between schemata and memories (i.e. eyewitness testimony).

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Bartlett, Frederic Charles

Introductory article

Henry L Roediger, Washington University, St Louis, Missouri, USA

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Frederic C. Bartlett (1886–1969) was a distinguished British psychologist who spent most of his career at Cambridge University. He is chiefly known today for his book Remembering: A Study in Experimental and Social Psychology, *which laid the foundation for schema theory.*

INTRODUCTION

Frederic C. Bartlett (1886–1969) was a distinguished British psychologist who spent most of his career at the University of Cambridge. He was trained as an experimental psychologist and became the most prominent English psychologist of his generation through the influence of his writings, his work on applied problems, and the great students he trained who continued work in his tradition. He is chiefly remembered today for his 1932 book, *Remembering: A Study in Experimental and Social Psychology*, which laid the foundation for schema theory and pioneered the study of memory distortions. Bartlett was knighted in 1948 for his great accomplishments, which are described briefly below.

BIOGRAPHICAL DETAILS

Early Life and Education

Bartlett was born in Stow-on-the-Wold, a small country town in Gloucestershire. His father was a successful businessman who made shoes and boots, but the educational opportunities in town were slim. A severe illness when he was 14 years old made it impossible for him to attend a boarding school, so young Bartlett stayed in Stow and educated himself with the aid of his family (his father had a great library) and friends. He eventually took a distance course at the University of London and settled on psychology, logic, sociology, and ethics as topics of study. He received an MA from London in 1911 and continued to Cambridge, where he came under the influence of W. H. R. Rivers, Cyril Burt, and C. S. Myers. He obtained his doctorate with first-class honors in 1914, just as Burt decided to leave Cambridge. Myers then offered Bartlett Burt's vacated position, so Bartlett stayed in Cambridge.

The First World War and Bartlett's Development

The First World War broke out soon after Bartlett took up his position at Cambridge. Most of Bartlett's colleagues left to aid the war effort, but poor health prevented him from joining them. However, the absence of people senior to him thrust him into the role of leading the psychological laboratory. He threw himself into teaching and began writing a book based on his dissertation, although it would not appear for many years. Much of his research during this time focused on practical problems driven by the war, such as detecting weak auditory signals in noise (to help with the problem of detecting German submarines). His war work eventually culminated in a book, *The Psychology of the Soldier* (1927).

After the war, Rivers and Myers returned to Cambridge and became Bartlett's associates. However, in 1922 Rivers died suddenly and Myers retired, so Bartlett became director of the Cambridge Laboratories and built them into a research powerhouse over the years. In the 1920s Bartlett's research turned to social anthropology, an early interest, and he wrote *Psychology and Primitive Culture* (1923). His international reputation expanded and he came to know distinguished psychologists from around the world.

REMEMBERING

In 1932 Bartlett published his great book, which is still in print today. *Remembering* actually grew out of his dissertation experiments begun in 1913, so the gestation period was nearly 20 years. The book

introduced a very different tradition for studying memory from the scientific methods of Ebbinghaus with their emphasis on careful control and measurement of memory in rather unnatural conditions. Bartlett's methods were casual, almost anecdotal, compared with those of Ebbinghaus, yet he uncovered powerful truths about remembering that reverberate through the field even today. Bartlett tested people under fairly relaxed conditions and his 'data' consisted largely of verbal reports with which he sprinkled his writing. (*See* **Ebbinghaus, Hermann**)

The early chapters of *Remembering* actually consist of studies of perceiving. The great middle part of the book is directly concerned with memory. The last section of the book deals with social and anthropological factors in cultural transmission. The general thrust of the book is to emphasize the constructive nature of cognition. Perceiving, remembering, and all of thinking involve the individual as part and parcel of the cognitive process. For example, in perceiving an ambiguous stimulus that is briefly presented, one's past background and experience determine what is perceived as much as (or even more than) the stimulus that is presented.

Bartlett devised two methods to study remembering: repeated reproduction and serial reproduction. In his most famous work he read a native American folk tale, *The War of the Ghosts*, to his British participants and then later tested their memories. This bizarre and supernatural story was usually read twice, aloud. In the repeated reproduction technique Bartlett would have his listeners recall the story after an interval of about 15 min. Next he would test their memory for the story at various later times, but with no further presentations of the story. Thus, repeated reproduction involves the same individual repeatedly reproducing the story, as the name implies. Bartlett's interest centered on how people remembered the story and how their memories would change over time and repeated retellings.

Not surprisingly, people remembered less about the story as time passed – their reports became increasingly short. Of more interest was the content of what they did remember and what these recollections indicated about the workings of memory. Besides becoming shorter, the stories became simpler, supernatural elements dropped out and other bizarre items would be reinterpreted. Bartlett called this process 'rationalization' because people added material to explain unnatural elements, or dropped them out altogether if they did not seem to fit the person's past experience. Rationalization over repeated retellings caused the story 'to be robbed of all its surprising, jerky and inconsequential form, and reduced it to an orderly narration' (p. 153 of the 1932 edition of *Remembering*). Bartlett also referred to the 'effort after meaning' that occurred in his perception and memory experiments, whereby people try to convert or recode elements that are difficult to perceive or understand into forms that can be comprehended. People try to impose structure and order to understand the world around them, even when their experience does not conform neatly to their prior categories.

Bartlett wrote that 'the most general characteristic of the whole of this group of experiments was the persistence, for any single subject, of the form of his first reproduction', and the use of 'a general form, order and arrangement of material seems to be dominant, both in initial reception and in subsequent remembering' (p. 83). He named this general form that people use to encode and to remember experiences a 'schema', a term now used throughout the cognitive sciences. A schema is a general organization of a story of a typical event. So, for example, many old films about the American wild west follow a schema involving 'good guys', 'bad guys', crisis, and resolution. The schema can aid encoding and retention of details that are consistent with it, but details that do not fit may be forgotten or distorted to fit the schema. In remembering *The War of the Ghosts* some English participants seemed to use the schema of a fairy tale, a genre to which they were more accustomed. Some even tacked on a moral at the end of the story.

The method of serial reproduction, the other major technique Bartlett introduced, is like the children's game of rumor or telephone. One person hears *The War of the Ghosts* (or is exposed to some other material) and recalls it after a set period. This person's recollections are then read to a second person, who recalls it in turn. This second recall is then read to a third person for later recall, and so on, through as many instantiations as desired. The changes in recall across repeated tests using the serial reproduction method are much greater than those in repeated reproduction, although Bartlett thought the same types of memory processes were at work (but in greater force). The serial reproduction technique involves a human chain, and if there were to be one weak link in the chain – someone who was wildly inaccurate in recall – then there would be no hope of a person later in the chain correcting the false memory of the material because that person would never have been exposed to the correct version. Reading through the lengthy samples that Bartlett provided in

Remembering (chapters 7 and 8) leads to agreement with his basic claims. The serial reproduction technique was later championed by psychologists studying the transmission of rumors.

The serial reproduction technique also served, Bartlett believed, as a useful analogy for the way information might be handed down from one generation to another within a society or even for the spread of ideas from culture to culture. He dealt with these issues in some detail, although with anecdotal evidence, in the last section of his book.

Bartlett's *Remembering* provides many interesting ideas and quotable passages. The book was well known at the time, but his research tradition did not really catch on. Part of the reason for this is that, in his hands, the research was more anecdotal than experimental (despite the subtitle of his book). He has been criticized for this lack of careful empirical research to document his points, and it was not until recently that a successful replication of his basic findings using the repeated reproduction technique appeared in print. Bartlett's book came to the forefront of the field when Neisser adopted Bartlett's theme of the constructive nature of cognition for his 1967 text, *Cognitive Psychology*, which helped to usher in the cognitive revolution in psychology. In the early 1970s psychologists such as Elizabeth Loftus, John Bransford and Marcia Johnson became interested in errors of memory and Bartlett's ideas were invoked and his book was once again read by a new generation.

Throughout *Remembering*, Bartlett's message ran counter to the idea that memory should be conceived of as static memory traces that are called to mind and read off in a more or less accurate fashion. Memory does not work like a video recorder, tape recorder, or computer. In his words, 'Remembering is not the re-excitation of innumerable fixed, lifeless and fragmentary traces' (1932, p. 213). Rather, 'remembering appears to be far more decisively an affair of construction rather than reproduction' (p. 205). 'It is an imaginative reconstruction, or construction, built out of the relation of our attitude towards a mass of organized past reactions or experiences' (p. 213). This credo still guides the field today in many ways.

LATER CONTRIBUTIONS

The Second World War confronted psychologists with many more practical problems to be solved. Bartlett and Kenneth Craik worked during the war on problems of skill acquisition, and Bartlett served on the Royal Air Force's Flying Personnel Research Committee, focusing his work on pilot training. They also studied related topics such as the effects of fatigue on performance. When Craik was tragically killed in an automobile accident two days before the war in Europe ended, Bartlett felt the loss keenly, because the men had become best friends as well as close collaborators.

After the war, Bartlett applied notions of skill learning to those of higher-order thinking, capitalizing on the insight that just as experts in a physical skill develop their exquisite expertise after many hours of practice, so do experts in thinking skills – problem-solving, reading X-ray graphs and so on. In 1958 he published *Thinking: An Experimental and Social Study*, which provided his insights on these topics. However, this book did not enjoy the earlier success of *Remembering*, although it too is an interesting treatise.

Bartlett retired from the chair of experimental psychology in Cambridge in 1952, but maintained his affiliation with the applied psychology unit which he had helped to found. His many students frequently called on him for advice and he continued to serve on national committees. Despite his early health difficulties, he remained generally robust in his later years, although he was bothered by hearing loss. He died after a brief illness on 30 September 1969.

CONCLUSION

Frederic Charles Bartlett wielded tremendous influence both nationally and internationally. Some commentators have remarked that this influence was out of proportion to his actual scholarly work. His contributions were good, but only one (*Remembering*) was of enduring importance. Rather, Bartlett's own charismatic character drew people to him and established his leadership, the power of his personality infecting those around him with his wit, his wisdom, his generosity, and his good nature.

Knighted, in 1948, Sir Frederic Bartlett received many other honors, including honorary doctorate degrees from seven universities in six countries. In Britain he was elected to the Royal Society in 1932 and received its Baly and Huxley medals in 1943. He was awarded the Royal Medal in 1952, the highest distinction a scientist in Britain can receive. In the USA Bartlett was elected to the American Philosophical Society, the National Academy of Sciences (as a foreign fellow) and the American Association of Arts and Sciences. Bartlett was a towering figure of twentieth-century psychology, and in recent years the study of human memory has come around to the approach he advocated so strongly in the 1930s.

Further Reading

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Bartlett Article Questions: Schemata and Memory **Name:**

1. Who was Sir Frederic Bartlett? Provide a brief summary of his life.

2. How did Bartlett's methods for studying memory differ from Ebbinghaus' methods?

3. What research method would you argue Bartlett employed? Explain Bartlett's procedures (i.e. What did he ask his participants to do? Explain both 'repeated reproduction' and 'serial reproduction' in your response.) and identify the participants in the study.

4. What were the general results of Bartlett's study? Specifically address the following when explaining the results: length of reproduction, rationalization, effort after meaning.

5. What is a schema? How can it aid *and* hinder memory?

6. Compare and contrast the results of our class' game of telephone (or your own experience in recalling the War of the Ghost) to Bartlett's results. Identify two similarities and two differences.

7. Evaluate Bartlett's work. Explain at least two strengths and two limitations to the methods he used in studying memory.

8. "Remembering appears to be decisively an affair of *construction* rather than *reproduction*" (pg. 205) Although Bartlett did not take a systematic, scientific approach to data collection, his work has greatly contributed to cognitive psychology -- how so?

***Extension* Questions:** Schemata can affect the memory process in different ways. How do schemata influence the encoding of information? How do they influence the retrieval of information? Would you say Bartlett's study demonstrated the effect of schemata on encoding, retrieval, or both? Explain.

Design an Experiment: Schemata and Memory **Researchers:**

Instructions: use the below matrix to develop a research proposal to scientifically study the effect of schemata on memory. Be clear and specific in your writing. You'll present the proposed study to the class.

What's the aim of the research? (Is the focus on encoding or retrieval?)	**What is the directional hypothesis? (If … then …)**
Is the study a field or lab experiment? Explain your choice.	**What's the experimental design (independent or repeated measures)? Explain your choice.**
What is the *operationalized* independent *and* dependent variable?	**Who is your target population and how will you select participants?**
Identify 2 - 3 variables you'll control and explain how you will control them.	**Procedures: What will you ask participants to do?**
Identify two confounding variables that could affect the study.	**Why is your research relevant? How might your study further psychologists' understanding of schemata's effect on memory?**